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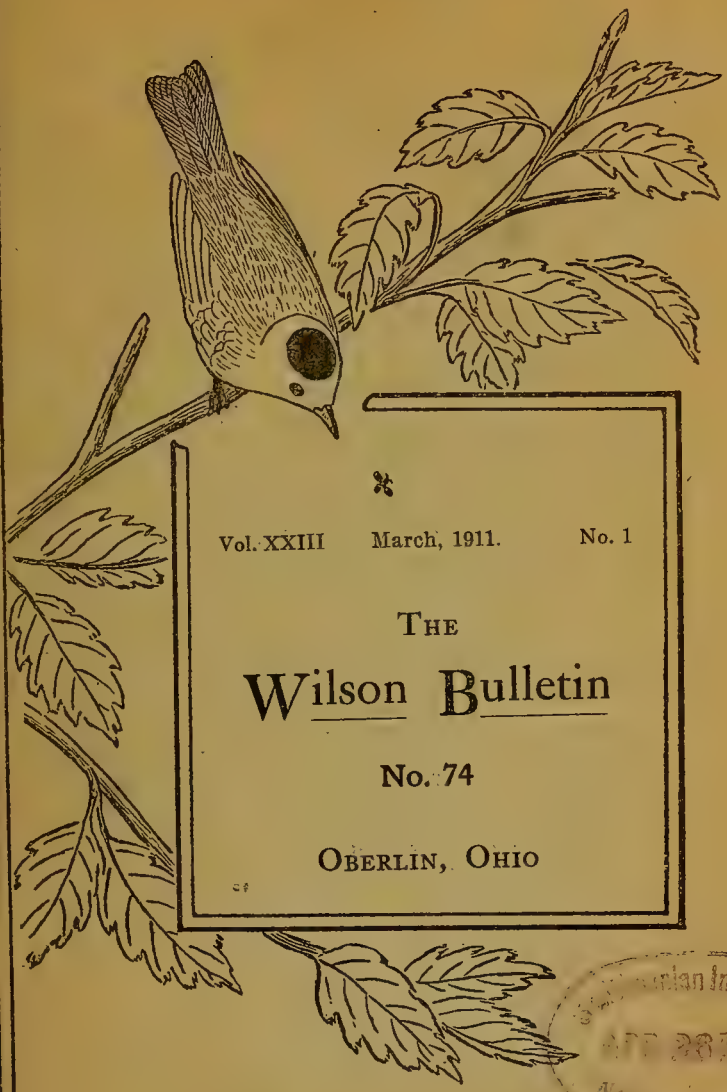

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OLD SERIES VOL. XXIII. NEW SERIES VOL. XVII.

SUMMER BIRD LIFE IN THE VICINITY OF HAVANA, ILLINOIS, IN ITS RELATION TO THE PROMINENT PLANT ASSOCIATIONS.

BY FRANK C. GATES.

EDITOR'S NOTE.—Upon the earnest solicitation of the author the simplified spelling has been allowed to stand in the body of the text, but the spelling of the vernacular names of the birds corresponds to the A. O. U. Check-List.

While the editor is personally in entire sympathy with the movement for reform in the spelling of English words, he does not believe that the movement has yet gained such impetus that he is warranted in adopting it in the Bulletin.

INTRODUCTORY.

While attending summer school during the latter part of June and the entire month of July, 1910, at the biological station of the University of Illinois, graduate work in ornithology was taken under Professor Frank Smith of that Institution. To him I am indebted particularly for helpful criticism of this paper.

LOCATION AND GENERAL DESCRIPTION OF THE REGION.

Havana, Illinois, is located on the east bank of the Illinois River, about forty miles south of Peoria, in the west central part of Illinois. Altho geografically located in this position

the region is not typical of central Illinois in general, for, as it is well known, the greater part of central Illinois is occupied by crops of one sort or another, but principally corn in black prairie soil.

This city, on the other hand, lies in about the center of the broad valley of a post-glacial stream, which was some fifteen to eighteen miles wide in this vicinity. The soil is either nearly pure sand or a sandy loam, yellowish in color, very different from the character of the average soil of Central Illinois. There are extensiv bottom lands in the immediate vicinity of the Illinois River of the present day which flows thru the center of this sandy area. In these situations there is usually a coating of muck laid down over the sandy bottom of the original stream.

The present river in this vicinity is about ⅛ miles wide, but taken together with the overflowed area it is from 0.5 to 3.5 miles from shore to shore. The bluffs which mark the original valley in post-glacial times are, of course, often farther apart. The water and the bottomlands furnish a typical avian environment, which is populated by its usual associations of birds. The east shore of the river is a modified dune surmounted by oak woods. The sandy uplands stretching back from this dune are quite largely under cultivation, but scattered here and there are areas of bunchgrass, blowouts, black oak and blackjack oak woods. Drainage is almost entirely subterranean and consequently creeks and swamps are a very minor part of the sum total of avian environments.[1]

[1] For a fuller and more extended discussion of the general character of this region, together with its history, consult the following:

Forbes, S. A. 1895. The Biological Station in the Biennial Report of the Director 1893-1894. Illinois State Laboratory of Natural History, pp. 14-26, with excellent illustrations.

Forbes, S. A. 1897. Biennial Report of the State Laboratory and Special Report of the University Biological Experiment Station 1895-1896, with map and illustrations.

Kofoid, C. A. 1903. The Plankton of the Illinois River 1894-1899, with introductory notes upon the hydrography of the Illi-

SOME GENERAL FACTORS.

Most important for maintaining an avian population is the food problem. This region is especially prolific in food supply for insectivorous birds. Insects are present in vast numbers, especially in the various bayous and lakes, which are part of the river system. Among the most plentiful insects were dragonflies, mayflies, beetles, flies, caddis flies, and chironomids.

An idea of the abundance of insects, especially of the mayflies, may be gathered from the fact that during their period of emergence, the adult mayflies (or as they are called in this region, "willow flies") collect so thickly around the lights of Havana during the night that the following morning these insects must be swept up and carted away to avoid the stench from their decaying bodies. On the morning of July 7, 1910, the second day of the emergence of *Hexagenia bilineata*[1] three piles of insects 3.5 feet in diameter and 1.5 feet high were seen on Main street in Havana. Around the lights at the foot of the bluff the street and part of the shore was carpeted with these insects to a depth of four to eleven inches.

Herbivorous birds do not fare so well in the region during summer. In but very little of the area can ruderal plants grow and form weed patches. Most of the plants whose seeds are eaten by birds matur their seeds during late summer and autumn and in consequence are of little attraction to summer birds. The town, itself, is surprisingly free from weed patches of more than a very limited extent. For this reason, perhaps, the English sparrows which are naturally attracted to the

nois River and its basin. Bulletin Illinois State Laboratory of Natural History, 6:98-251.

Hart, C. A. and Gleason, H. A. On the Biology of the Sand Areas 1907 in Illinois. Bulletin, Illinois State Laboratory of Natural History, 7:139-148.

Gleason, H. A. The Vegetation of the Inland Sand Deposits of Illi- 1910. nois. Bulletin, Illinois State Laboratory of Natural History, 9:23-174.

[1] Determination furnisht thru the kindness of Mr. Chas. A. Hart of the summer session staff.

dwelling places of man, not finding sufficient food there, flock in groups of 25 to 150 and invade the wheat and clover fields. It was noticed repeatedly that whenever English sparrows invaded crop lands it was virtually always in good sized flocks.

Aside from food there are other factors in the environment which favor an abundant bird population. The large number of protected nesting sites is an important factor in this region, which has seemed to increase the number of individuals within a given species. The general climate is favorable and the duration of the warm weather is such that two or even three broods may be raised each year.

Altho there would seem to be plenty of sustenance for birds of prey, their general absence was conspicuous. This is probably due to the many gunners in this region, both in and out of season, but particularly during the early spring. By the end of the hunting season the hawks that would have nested here have found nesting sites elsewhere and their occurrence in this vicinity seems to be merely accidental.

One might easily judge from the forgoing description of the region that, containing as many varied environments as it does, the bird population would be conspicuous both for number of species and for abundance of individuals. The region is indeed well populated with many individuals of a comparativly few species, but the total number of species is not so large as might be expected, since the region lies a little ways north of the northern limit of the southern avifauna and quite a ways south of the southern limits of a large number of northern species. However, the bird life is rich in comparison with the rest of central Illinois.

In this paper the plant associations form the basis for division. By such a method a much better idea of the relationships of the avifauna is brought out than an annotated list of the species, tho it is recognized that this analytical method does not necessarily yield the ecological avian associations. They are the product of a more thoro synthetic insight into avain relationships. It is highly probable that avian associations will be correlated with plant associations or groups of

them, altho that can not be deduced from this paper since the plant associations, themselves, formed the basis of division in obtaining the avian groups.

The plant life of the region is representativ of two biotic provinces, the southwestern prairie province and the deciduous forest province, the former of which will be taken up first.

THE PRAIRIE PROVINCE.

In this area the prairie province is represented, on the plant side, most extensivly by crops, fairly well by the bunchgrass and blowout associations and to a slight degree by eight or ten of the more hydrofitic associations along ditches and streams and at the heds of lakes.

The larger part of the available land is under cultivation in corn, rye, oats, wheat, or clover. Other open land is used for pastur and in it occur the bunchgrass associations. Where pasturing becomes too intensiv blowouts usually originate, develop and finally are recapturd by the vegetation. To a limited extent the prairie swamp associations are present along sloughs and ditches, of which there are very few in this region. The best developt examples of prairie swamp occur in two abandond and partly draind mill ponds in Quiver Creek, between the Quiver and Topeka stations of the Chicago, Peoria and St. Louis Railroad.

BUNCHGRASS PRAIRIES. In the xerofytic prairie areas there seems to be plenty of small animal life, but bird life is rather scarce. Only a few typical prairie birds are present, and most of these both in point of number of species and of individuals are sparrows. In order of abundance these are dickcissels, vesper sparrows and lark sparrows. They may be termd the dominant species of the bunchgrass prairie association. Nests of the vesper and lark sparrows were discoverd in the bunchgrass. The dickcissel is a typical prairie bird which, however, is much more frequently seen along the roadside on fence posts, wires or hedges, from which elevated positions it makes known its presence to any intruder.

The meadowlark, normally a dominant species on the prairies of Illinois, is, this year at least, merely a secondary species in this vicinity. It occurs very sparingly in the prairie swamp near Topeka, but prefers the crop areas to the bunchgrass prairies. On two occasions there was good evidence that the meadowlark in the bunchgrass was the western meadowlark (*Sturnella neglecta*), a thoroly typical form of such habitats, but as the birds did not sing and were very wary of approach, it was impossible to settle the question absolutely.

Aside from the dominant species which make up the greater number of individuals, there are but few secondary species occurring in the bunchgrass and blowouts. Of these the most frequent is the mourning dove, which is quite often flusht from the bunchgrass, but no chances were afforded of determining whether these birds were feeding or not. The remaining birds occurring in this association are more typical of other associations and their occurrence in the bunchgrass is more or less accidental. Such are the bob-whites, English sparrows and the crows, especially in the vicinity of the oak woods. Others such as the brown thrasher and mockingbird are purely accidental in such locations.

In the following tables the avian composition of each plant group is shown, together with the status of each bird in it. Preceding the name of the bird is a letter indicating the ecological status of the bird in that association.

d = of primary importance or abundance — a dominant species.
s = of secondary importance or abundance.
t = of tertiary abundance but frequently associated with successions in the plant associations.
a = of accidental occurrence.

Following the name of the bird is a symbol indicating the life activities and a statement of the abundance of the bird in the plant group under consideration. The summer life activities of the birds are classified under three heads, which are indicated as follows:

n = nesting activities.
f = feeding activities,
r = other activities, such as resting, sleeping, playing, etc.

SUMMER BIRDS OF THE BUNCHGRASS PRAIRIE ASSOCIATION.

s	Bobwhite	f r small flocks
s	Mourning Dove	f r twos or threes.
a	Kingbird	f singly (2 records)
s	Crow	f r singly
s	Meadowlark	f r very few
d	Western Meadowlark	n f r pairs
d	Vesper Sparrow	n f r flocks
d	Lark Sparrow	n f r small flocks
t	English Sparrow	f flocks
d	Dickcissel	n f r flocks or pairs
a	Mockingbird	r one record
a	Brown Thrasher	f singly now and then.

SUMMER BIRDS OF THE CROP AREAS.

Bob-white.	Clover wheat
Mourning Dove.	Clover wheat corn rye oats
Crow.	wheat corn
Vesper Sparrow.	wheat rye
English Sparrow.	Clover wheat rye oats
Lark Sparrow.	wheat
Dickcissel	Clover wheat rye
Meadowlark.	Clover wheat

PASTURS AND MEADOWS. The development of either of these two types of vegetation is very meager in this vicinity and the characteristic birds—at best limited in numbers—are virtually indiscernable as such. Those birds that are usually to be found associated with these plant groups are the mourning dove, cowbird, meadowlark, English sparrow and the pigeon.

PRAIRIE SWAMPS. Prairie swamps are not of general occurrence in this territory as the rapid drainage in the sandy soil does not favor the concentration of water necessary to their development. Before the opening of the Chicago drainage canal such swamps were far more abundant, but most of them hav been converted into open water. On the plant side small prairie swamps can very easily be detected, but usually they are so limited in extent that they do not attract their normal bird population. Such areas form the minor avian envi-

ronments of Adams. (Isle Royal Report 1908:133.) Along Quiver creek in the vicinity of Topeka, however, there are two fair sized prairie swamps, which were a few years ago mill ponds. The principal plant associations represented are the *Scirpus validus* (Bulrush) association; the cattail, the arrowleaf, the *Calamogrostis* (a meadow grass), the *Lythrum* consocies of the blazing star prairie, and the redtop-bluegrass pastur associations. The birds noted there during the early part of July befor the return migration had set in were as follows: one pair of bobolinks, three pairs of meadowlarks, about fifteen pairs of red-winged blackbirds, a few indigo buntings and a half dozen short-billed marsh wrens. Additional species were noted toward the end of July after the beginning of the fall migration. All of these birds which occurred here during the summer proper are dominant species of this association where it occurs in other parts of the state. Altho they are not abundant in this locality, they illustrate a distinct avian group. The bobolink and short-billed marsh wren are index birds of this group. This is especially true of the bobolink, which is here nesting rather south of its usual southern limit. The other birds are as typical, but they are not so limited in distribution to this particular prairie swamp area.

SUMMER BIRDS OF THE PRAIRIE SWAMP.

d	Great Blue Heron	f one record
s	Green Heron	f one record
d	Bobolink	n f r one pair
d	Red-wing Blackbird	n f r 15 pairs, later large flocks
d	Meadowlark	n f r few
s	Bronzed Grackle	f r flocking with the redwings preliminary to the fall migration.
d	Indigo Bunting	n?f r few
t	Dickcissel	r two records
t	Northern Yellow-throat	f r one record
d	Short-billed Marsh Wren	n f r half a dozen birds
a	Robin	f r one record

THE FOREST PROVINCE.

The associations of the deciduous forest province cover more than half of the area in the vicinity of the Biological Station. This province falls naturally into two groups of associations, those of the bottomlands and those of the uplands. The former is composed largely of hydrofytic plants and the latter of those of mesofytic and xerofytic tendencies.

AQUATIC ASSOCIATION. Arranging the associations in a normal genetic series, the aquatic association comes first into consideration. It consists of the waters of the Illinois River, together with the numerous lakes, bayous and creeks that drain directly or indirectly into it. The area is relativly very large in comparison to the number of birds by which it is populated during the summer. Even as it is, many of its present members are purely accidental, as it is not uncommon for wounded migrating ducks to remain in the lakes all summer. The population at present is very much smaller than formerly, for which hunters are mostly responsible.

Birds which are found associated with the water may be divided into two groups, those that are naturally in or on the water and those that are usually in the air above it. Treating of those whose essential element is water rather than air alone, the double-crested cormorant and the pied-billed grebe were the only members noticed breeding within the vicinity, altho the wood duck is known to hav bred there in 1909. The breeding range of the cormorant, as usually given, is from Minnesota northward. This remarkable southern extension of this bird's breeding range is described in detail by Frank Smith (Auk, 1911: 16-19).

Other members of this group which are very irregular in number and distribution are the ducks, of which the following were noted during July, 1910: a red-breasted merganser, mallard, lesser scaup and a blue-winged teal. Altho occasionally seen in the open river they are more abundant in the north end of Thompson's Lake. This region is south of the present

limits of the breeding ranges of most of our aquatic birds and this explains the absence of many water birds which one might well expect to find in such country as this.

Speaking in the strict sense of the term, the summer's work revealed but two members of the group of aquatic birds which spend most of their time in the air over the water, namely, the black and the common terns, of which the former was by far the more abundant. Apparently they spent most of their time in the northern part of Thompson's Lake, but two or three birds were liable to be seen almost any time in the vicinity of the Biological Station, over Flag Lake or the Illinois River and following every brisk northerly wind flocks of 25-40 birds would come down the Illinois River to Havana Lake.

Aside from the strictly aquatic birds which hav been treated of above, there are several other birds whose association with water is determined by the location of their food. But one of these birds, the kingfisher, obtains food in the water. The others, all of which are insectivorous birds, obtain their food by flying back and forth over the water. In respect to their other activities these birds are, however, land birds. The swallows are the most conspicuous members of this group. Little need be said of these birds as they are insectivorous and must obtain their food from the haunts of the insects. The presence of grackles and red-headed woodpeckers in the group seems somewhat peculiar to one used to them in other portions of central Illinois. The red-headed woodpecker belongs rather to the bottomland forests, but these birds were quite often seen flying back and forth over the water and were observd catching insects with an agility that would do credit to one of the flycatchers. The grackles were quite fond of flying back and forth across the river, especially in the early dawn and in the twilight. They did not display markt flycatching ability, but they took what insect food they could obtain in flying in a course which was not characterized by flycatcher-like antics.

SUMMER BIRDS OF THE AQUATIC ASSOCIATION.

Normal or strictly aquatic species—

Water Inhabitants—				
d	Pied-billed Grebe	n	f r	one pair in 1910.
d	Double-crested Cormorant	n	f r	Two flocks of 7 and 26 birds in Mud Lake and in Flag & Thompson's Lakes respectively.
(d	Wood Duck	n	f r	irregularly, not present in 1910)
d	Red-breasted Merganser		f r	two birds seen three times.
d	Mallard		f r	one seen a few times.
d	Lesser Scaup Duck		f r	one bird seen twice
d	Blue-winged Teal		f r	one bird seen once.
Air Inhabitants—				
d	Black Tern	n	f r	a colony of about 70 birds
d	Common Tern	n?	f r	a few birds with the above.

Semiaquatic species—

Food Submerged				
d	Belted Kingfisher		f	common
Food above water				
d?	Mississippi Kite			two birds in the air over the Illinois River, June 29, 1910.
s	Red-headed Woodpecker		f	several
s	Nighthawk		f	scarce
d	Chimney Swift		f r	not common
s	Kingbird		f	one pair
s	Phœbe		f	common
s	Bronzed Grackle		f	common
s	Purple Martin		f	scarce
d	Cliff Swallow		f	rare
d	Tree Swallow		f	abundant
d	Bank Swallow		f	few
a	Robin		f	scarce
a	Bluebird		f	rather scarce

THE STRAND ASSOCIATIONS.

The strand is not well represented in this region on account of the persistent high water in the Illinois River and adjacent lakes, following the opening of the Chicago drainage canal. Wherever it occurs it is of either a muddy or sandy textur.

The sand strand that was under observation formed the east bank of Quiver Lake and parts of the shore of Lake Matanzas. It was not extensiv in area, even tho it was develop linearly for quite a distance. It did not support much of a bird population, altho along it there was an abundance of food materials, consisting largely of fish, insects, clams, snails, and plants, left on the beach by the slowly subsiding river. The summer bird population did not contain a single species typical of this bird association. The birds noted were mostly birds coming to the shore to bathe. Toward the end of July the fall migration set in with the inroad of various kinds of sandpipers. This increase was added to the bird life of the strand and made it seem more natural. Following each north wind the sandpipers began to appear singly and in small flocks all along the river. These flocks continually workt southward. Most of the flocks kept at such a distance that specific determination was well nigh impossible. Those identified were, for the most part, solitary, spotted, pectoral and semipalmated sandpipers and the killdeer plover.

There was a much greater expanse of mud strand, which is submerged during the high waters of spring. When emerged it occurs as mud flats or as muddy strips within the willows. As it is not exposed during the time of the spring migration of mud strand birds, its avian population is very small in comparison with what it might otherwise hav been. As not many of the mud strand birds range this far south during the summer, the population is further reduced. However, there are a few typical species each represented by a few individuals. As in the case with the sand strand, the mud strand bird population is largest during the migrations, which is outside of the scope of this article.

SUMMMER BIRDS OF THE SAND STRAND.

d	Green Heron	f r occasional
d	Phœbe	f bathing not uncommon
s	Bronzed Grackle	bathing common
s	Robin	bathing fairly common

AFTER THE FALL MIGRATION HAD COMMENCED.

d Spotted Sandpiper	f r	abundant
d Semipalmated Sandpiper	f r	fairly common
d Solitary Sandpiper	f r	abundant
d Pectoral Sandpiper	f r	common
d Killdeer Plover	f r	several

SUMMER BIRDS OF THE MUD STRAND.

d Bittern	f	one record
d Great Blue Heron	f r	common
d Green Heron	n f r	common
d Coot	f	one record
d Wilson Snipe	f	one flock seen once
d Solitary Sandpiper	n?f r	one or two families in the summer, but abundant in the fall migration .
d Pectoral Sandpiper	f r	common in the migration
d Semipalmated Sandpiper	f r	fairly common in the fall migration
d Spotted Sandpiper	f r	abundant in migration
d Killdeer Plover	f r	several in migration.

THE THICKET ASSOCIATIONS.

No real mesofytic or xerofytic thickets are present in this region. A few birds which are elsewhere typical of such thickets hav adapted themselves to the more or less similar conditions which do exist in this vicinity, that is to say, to the hedges and the small orchards in the vicinity of houses.

With the exception of three or four of locust (*Robinia pseudo-acacia*) hedges are of osage-orange (*Maclura pomifera*), which not only fulfills the ordinary purpose of a hedge but also serves as a wind break, preventing excessiv wind action on the mobil sand. To accomplish the latter purpose the osage orange must be allowed to develop to good size, which incidentally furnishes ample protection to many birds.

SUMMER BIRDS OF THE HEDGES(=THICKET ASSOCIATION).

s Bluebird	r	not common and most often seen on wires near hedges.
s Robin	n f r	not common away from man
d Carolina Chickadee	n f r	a few in several different hedges

s	Tufted Titmouse		f	r a very few in hedges
d	Brown Thrasher	n	f	r quite common
s	Catbird	n	f	r a few especially near houses
d	Mockingbird	n	f	r not many individuals, but almost universally in hedges
s	Warbling Vireo		f	r a few in hedges near woods
d	Migrant Shrike	n	f	r a very few in this region
s	Dickcissel			r This bird quite commonly uses the hedges as a point of vantage from which to look and to sing. Wires are, however, preferred to a noticeable extent when the wires are near the hedges.
s	Rose-breasted Grosbeak			r few and only occasionally
d	Cardinal	n	f	r quite common
t	Towhee			r one record
s	Indigo Bunting		f	r few
d	Field Sparrow	n	f	r common
s	Lark Sparrow			r rarely
s	Vesper Sparrow			r rarely
s	Goldfinch			r not common
s	Bronzed Grackle			r occasionally
s	Baltimore Oriole		f	r frequent
d	Orchard Oriole	n	f	r frequent
t	Cowbird			r occasionally
s	Crow			r seldom
t	Blue Jay			r infrequent
s	Kingbird			r occasionally
s	Northern Flicker		f	r occasionally
s	Red-headed Woodpecker		f	r not infrequent
s	Downy Woodpecker		f	r very few
s	Hairy Woodpecker		f	r two pairs and their young
s	Black-billed Cuckoo		f	r occasionally
s	Yellow-billed Cuckoo		f	r not infrequent
d	Mourning Dove	n	f	r common

From the length of the list of hedge birds one might think that hedges were favorit places for birds, but the fact is that where hedges occur they are usually the only points of vantage from which the birds can watch the movements of intruders. They afford birds of the crops, of the bunchgrass prairies, and of the roadsides, lookout stations which virtually

no bird disdains to use. The typical hedge birds which are usually found in the hedges themselves are the mockingbird, brown thrasher, field sparrow, mourning dove, Carolina chickadee, migrant shrike, cardinal and the black-billed cuckoo. Somewhat secondary to these are the bluebird, robin, Baltimore oriole, northern flicker, red-headed woodpecker, and the blue jay.

HYDROFYTIC THICKET ASSOCIATION.

In this vicinity virtually all the thickets of this plant association hav been drowned since the opening of the Chicago drainage canal. Several of the plants which formed these thicket associations are still present in this region, but they are so mixt with parts of the tree associations that they no longer form an element in the description of the region. Formerly the *Salix-Cephalanthus* (Willow-Buttonbush) association was quite extensivly distributed in this region, but at the present writing almost everywhere the willows grow, they form trees and the few button-bushes that remain are scraggly shrubs among the willows, where they are slowly being killed. The region around the hed of Lake Matanzas is a partial exception to this statement, for there this association is normal in structur, altho limited in distribution.

The birds that are usually characteristic of this association hav adapted themselves to the changed conditions. This does not seem difficult, for the preferences of the summer birds of this region do not seem to differentiate between bottomland thickets and bottomland woods. Investigation of the very limited areas that approach the former conditions indicate that the birds that were most typical of this association were the song sparrow, indigo bunting, red-winged blackbird, tufted titmouse, Carolina wren, catbird, and the Northern yellow-throat.

THE BOTTOMLAND WOODS.

The bottomlands of this region are quite extensiv, consisting of the parts of the banks of streams and lakes, together with the "towheads" and "willow-islands" separating

some of them. Repeated high waters of long continued duration hav caused a great increase in the number and development of willows of the species, *Salix longifolia*, which has largely superceded the former lowland forest.

Virtually all of the normal undergrowth has been killed. When the bottomland becomes emerged in summer the ground is usually covered with a dense growth of composit, 1.0 to 2.5 meters high, the most common species of which are *Xanthium commune* (cocklebur), *Ambrosia trifida* (giant ragweed), *Solidago spp* (goldenrods), *Aster spp* and *Boltonia decurrans*. The bottomland woods are quite free from shrubby undergrowth as it cannot withstand the action of the ice, together with the continued submergence. In a few open places, however, there are small thicket-like areas composed of willow (*Salix longifolia*), *Adelia acuminata*, and much less frequently some straggly half ded buttonbush.

The bottomland woods are not very dense and the trees are usually leafy almost to the very base. Spiders are very abundant and their webs make dense tangles thruout the foliage. Small insect life is also very abundant, and in addition there is a wealth of molluskan forms.

The bottomland woods in the vicinity of Lake Matanzas partake much of the typical character of a bog, and necessitates special consideration because some of the members of its avifauna were found nowhere else in this region. The tree growth, which dominates the greater part of the bog except at the line of springs at the foot of the bluff, consists largely of soft maple, elm, ashes, birch (*Betula nigra*) and sycamor with dogwood, wild rose, buttonbush and willows as the principal shrubby growth. The courses of the little creeks that flow from the springs are markt by the growth of *Leersia*, one of the grasses, bordered by willows and buttonbushes.

Birds of these bottomland woods are fairly numerous and quite varied in species. Almost without exception they are insectivorous birds. The flycatcher family is the best represented with numerous wood pewees and phoebes, a smaller

number of crested flycatchers and a few kingbirds. The kingbirds are essentially marginal in their position in the willows. The wood pewees are interior birds, while the crested flycatcher and the phoebe partake somewhat of the character of each. The blackbird is second in importance and the vireo family is third. The red-winged blackbirds make their presence known at all hours of the day by their incessant "Kong-querree." Of the vireos the red-eyed and yellow-throated are rather scarce, but the warbling vireo is very abundant. Altho abundant it is ordinarily seldom seen, as it gleans in the dense foliage for the many insects that are present. It harmonizes exceedingly well with its background, but its presence can always be detected by its characteristic sweet song, which is kept up nearly all day long.

To this association may be accredited the warblers that remained here during the summer. Two warblers, the prothonotary and the Northern yellow-throat, were quite uniformly distributed over the bottomland wooded areas, altho the former was by far the more abundant. Three other species of warblers were localized in the Matanzas bog, and with the exception of one redstart in the Spoon river bottoms were seen nowhere else. These were the redstart, the Kentucky and the hooded warblers. As this bog harbored also the yellow-throat and the prothonotary, it contained the complete warbler list for the summer. The most abundant warbler — and almost the most abundant bird in the willows — was the prothonotary warbler, which finds a wealth of nesting sites in the many rotting willow stumps. These birds keep up a well nigh incessant chattering thruout the day. They also make their presence known by rapid darts from one tree to another, their orange to yellow colored heds and bodies appearing like gems in the green foliage. They quite often make excursions across the water during the course of which they usually fly but little above its surface. They are at their best when they are percht at the end of a limb on a dead tree, when they stand out quite vividly against the blue background of sky. Toward

the end of July, just preliminary to their southward migration, these warblers deserted the willows, in which they had livd all summer, and flockt together in the oak woods. A very few individuals remaind in the willows for about a week

SUMMER BIRDS OF THE BOTTOMLAND WOODS.

s	Bluebird		f	r very few
t	Robin		f	r very, very few
d	Wood Thrush	n	f	r common
d	Blue Gray Gnatcatcher		f	r one record
d	Carolina Chickadee	n	f	r fairly common
s	Tufted Titmouse	n	f	r several
t	White-breasted Nuthatch	n	f	r not many
t	Parkman House Wren	n	f	r two pairs
d	Carolina Wren	n	f	r very few
a	Brown Thrasher		f	r scarce
s	Catbird	n?f		r occasionally
d	Redstart	n	f	r two or more pairs
d	Hooded Warbler	n?f		r one seen on different days
d	Northern Yellow-throat	n	f	r few
d	Kentucky Warbler	n?f		r at least four birds
d	Prothonotary Warbler	n	f	r very abundant
d	Yellow-throated Vireo	n	f	r two pairs
d	Warbling Vireo	n	f	r abundant
d	Red-eyed Vireo	n	f	r few
s	Bank Swallow			r several
d	Tree Swallow	n	f	r many
s	Indigo Bunting	n	f	r few
s	Rose-breasted Grosbeak	n	f	r few
d	Cardinal	n	f	r few to several
s	Song Sparrow	n	f	r few
a	English Sparrow		f	r occasional flocks
t	Goldfinch			r few
d	Bronzed Grackle	n(f)		r many
d	Baltimore Oriole	n	f	r several
d	Orchard Oriole	n	f	r few
d	Red-winged Blackbird	n	f	r abundant
a	Cowbird			r few
s	Crow	n?f		r few
s	Blue Jay		f	r few
s	Northern Flicker	n	f	r few
d	Red-bellied Woodpecker	n	f	r very few
d	Red-headed Woodpecker	n	f	r abundant

d	Hairy Woodpecker	n	f	r few
d	Wood Pewee	n	f	r very abundant
d	Phœbe	n	f	r common
d	Crested Flycatcher	n	f	r several
d	Kingbird	n	f	r few
ds	Belted Kingfisher			r common
d	Black-billed Cuckoo		f	r few
d	Yellow-billed Cuckoo		f	r common
d	Sparrow Hawk	n	f	r at least two pairs with young
t	Marsh Hawk			r one record
d	Mourning Dove	n	f	r common to abundant
t	Solitary Sandpiper		f	r one family noted along the margin in July
t	Spotted Sandpiper		f	r a few along the margin. (These two sand-pipers come within this association because with the reversal of successions caused by high water the mud flat is encroaching on the willows.)
s	Green Heron	n	f	r marginal and common
s	Great Blue Heron	n	f	r semimarginal and several
s	Bittern			r one record
t	Double-crested Cormorant	n		r 32 individuals in 1910.

THE UPLAND FOREST ASSOCIATIONS. All of the upland woods in Mason County, in the vicinity of Havana are of one or the other of two plant associations, the black oak or the mixt forest associations. Together they cover quite a little of the region, particularly the ridges, with a moderately open growth of woods.

The black oak is the earlier stage in a genetic series. It is composed typically of black oak (*Quercus velutina*) and blackjack (*Quercus marilandica*), the latter being more frequently a marginal tree. The shrubbery growth is very largely composed of the young trees of the two oaks and of a hickory. In addition there are a few normal shrubs, such as sumac (*Rhus canadensis illinoensis*), redroot (*Ceanothus americanus*), gooseberry (*Ribes gracile*) and blackberry (*Rubus spp*). This growth is largely confined to the margins and to the openings. The development of vines is slight and the

herbaceous growth is largely more or less xerofytic in natur.

Many of these black oak woods are giving place to a more mesofytic type of woods, to which the term "mixt forest" has been applied by Gleason.[1] The succession is evidenced by the inroad of hickories and vines, which giv proof of a more mesofytic soil, altho the tree growth may still retain about the same percentage composition as befor. This is because conditions are ripe for succession, but supercedance of the dominant species takes place after the death of the dominant species of the first association. This is taking place slowly, giving expression to a woods in which the trees are still largely typical of the black oak woods, while the undergrowth is distinctly of the mixt forest type.

MIXT FOREST. The forest association to which this term has been applied is well developt, especially on some of the ridges near the Illinois River. It is a forest of five or six principal kinds of trees, of which as high as 50% may be black oak (*Quercus velutina*). Aside from this tree the principal trees are hickories (*Hicoria cordiformis* and *Hicoria glabra villosa*), hackberry (*Celtis occidentalis*), elms (*Ulmus americana* and *fulva*, *bur oak* (*Quercus macrocarpa*) and white oak (*Quercus alba*). The ground supports a luxuriant growth of vines, herbs and shrubs. The vines, Virginia creeper, bittersweet, poison ivy, and grape are very characteristic of the earlier stages of this association. Later the ground is coverd with more typical mesofytic plants.

Both of these two types of upland woods are characterized by quite a number of birds, which are not so exclusivly insectivorous as those of the bottomland woods. Several of these are far more often heard than seen and but very few of the species are obtrusiv. There is comparativly little difference in the species list of each of these two associations as nearly every bird that occurs in one occurs in the other also.

[1] Gleason, H. A. The Vegetation of the Inland Sand Deposits of Illinois, Bulletin, Illinois State Laboratory of Natural History, 9:135, 1910.

There may be, however, a decided difference in abundance of individuals in either association. This will be indicated in the table of species.

SUMMER BIRDS OF THE BLACK OAK FOREST ASSOCIATION.

t	Robin		r	uncommon or rare
d	Wood Thrush	n f	r	fairly common
s	Carolina Chickadee	f	r	few
t	Tufted Titmouse	f	r	not many
d	White-breasted Nuthatch		r	common
t	Brown Thrasher		r	scarce
s	Mockingbird	f	r	scarce
d	Warbling Vireo	n f	r	common
d	Cardinal	n f	r	few
d	Towhee	n f	r	few
t	Goldfinch		r	few
s	Bronzed Grackle	f	r	not very common
s	Baltimore Oriole	f	r	few
d	Crow	n f	r	scarce in this region in general
d	Blue Jay	n f	r	few
d	Wood Pewee	n f	r	common
s	Crested Flycatcher		r	scarce
d	Northern Flicker	n f	r	very few
d	Red-headed Woopecker	n f	r	common
d	Yellow-billed Cuckoo	f	r	few
d	Broad-winged Hawk	n?f	r	two pairs
d	Mourning Dove	n f	r	several
d	Bob-white	n f	r	several

SUMMER BIRDS OF THE MIXT FOREST ASSOCIATION.

s	Bluebird		r	scarce
d	Robin	f	r	not common
d	Wood Thrush	n f	r	abundant
t	Carolina Chickadee	f	r	scarce
t	Tufted Titmouse	f	r	not many
d	White-breasted Nuthatch	n f	r	abundant
t	Brown Thrasher		r	scarce
s	Catbird	f	r	scarce
t	Northern Yellow-throat		r	scarce
t	Yellow-throated Vireo	n f	r	one pair

d	Warbling Vireo	n	f	r abundant
d	Red-eyed Vireo	n	f	r scarce
d	Scarlet Tanager	n	f	r few
t	Indigo Bunting			r few
d	Rose-breasted Grosbeak	n	f	r few
d	Cardinal	n	f	r few
s	Towhee	n	f	r few
t	Goldfinch			r few
s	Bronzed Grackle			r more or less common
d	Baltimore Oriole	n	f	r common
d	Orchard Oriole	n	f	r few
t	Red-winged Blackbird			r not common
d	Cowbird	eggs	f	r few
s	Crow		f	r scarce
d	Blue Jay	n	f	r common
d	Wood Pewee	n	f	r abundant
d	Phœbe	n?f		r few
d	Crested Flycatcher	n?f		r few
t	Kingbird			r one pair
t	Nighthawk			r very few
t	Whippoorwill			r two or three
d	Northern Flicker	n	f	r not many
t	Red-bellied Woodpecker	n	f	r at least one family
d	Red-headed Woodpecker	n	f	r common
d	Downy Woodpecker	n	f	r one pair with young
d	Hairy Woodpecker		f	r very few
d	Yellow-billed Cuckoo		f	r few
d	Red-tailed Hawk		f	r one
d	Mourning Dove	n	f	r several
t	Bob-white		f	r very few

In addition to the groups of birds which hav been given above there are a few birds which can not well be included in any of them. Birds, such as the chimney swift, the nighthawk and, in this region, the goldfinch, are virtually never seen except as they are flying about in the air. The swallows likewise spend a great deal of their time in the air, flying about in search of food. The Mississippi kite is placed here on the basis of but one record.

The open dirt banks of the river form the fysiografic basis for another grouping of birds, consisting of those birds which bild their nests in such situations. In cases where several strata are exposed some are pickt to the exclusion of others for

the tunnel, at the base of which is placed the nest. To this group belong the bank swallow and the kingfisher.

Still other birds are influenced in their distribution primarily by man. Most of such birds prefer to liv near human habitations, while others seem to remain near dwelling places and, at least, tolerate man. In so far as was noticed during this summer the following birds might accordingly be classed as domesticated "d" or semidomesticated "sd."

d Robin
sd Wood Thrush
d Parkman House Wren
d Catbird
sd Mockingbird
sd Warbling Vireo
sd Rose-breasted Grosbeak
d Cardinal
d English Sparrow
d Baltimore and Orchard Orioles
sd Wood Pewee
sd Northern Flicker
sd Red-headed Woodpecker
sd Yellow-billed Cuckoo
sd Ruby-throated Hummingbird
sd Blue Jay

GENERAL CONCLUSIONS.

Consideration of the forgoing data shows that the more extensiv plant groups hav associated with them certain birds which, as a group, are partial in their habitat preferences — in this region at least — to those plant associations.

Birds of the wooded areas of this part of Illinois are much more numerous, both in number of species and of individuals than those of the prairies.

Lowland woods are more plentifully and more diversely populated than upland woods.

Birds are far more restricted in their daily movements than one would at first think possible. While birds need not necessarily be confined to one plant association or closely allied

groups of plant associations, they are quite likely to be and most birds pursue all their summer life activities within the same plant formation.

In certain cases bird activity is one of the prime factors in causing plant succession which in turn is followed by a change in the character of the bird population. Such is obviously the case in the transition from the black oak to the mixt forest associations, in which the birds play the role of seed distributors of the vines and shrubs which hav given rise to a most prominent characteristic of the mixt forest.

Studies similar to this in restricted areas thruout the country and in every season of the year are necessary in order to obtain a clearer insight into avian ecology.

Systematic Array of Summer Birds of Havana, Ill.

	Prairie Province		DECIDUOUS FOREST PROVINCE										
						Thickets		Woods					
	Bunchgrass Prairies	Prairie Swamps	Aquatic	Sand Strand	Mud Strand	Hedges and Orchards	Hydrophytic Thickets	Bottomland Woods	Black Oak Forest	Mixt Forest	Bluff Face	Town
	1	2	3	4	5	6	7	8	9	10	11	12
PIED-BILLED GREBE Podilymbus podiceps			d									
COMMON TERN Sterna hirundo			d									
BLACK TERN Hydrochelidon nigra surinamensis			d									
DOUBLE-CRESTED CORMORANT Phalacrocorax a. auritus			d					t				
RED-BREASTED MERGANSER Mergus serrator			d									
MALLARD Anas platyrhynchos			d									
BLUE-WINGED TEAL Querquedula discors			d									
WOOD DUCK Aix sponsa			d									
LESSER SCAUP DUCK Marila affinis			d									
BITTERN Botaurus lengtiginosus					d			s				
GREAT BLUE HERON Ardea h. herodias		d			d			s				
GREEN HERON Butorides virescens		s		d	d			s				
COOT Fulica americana					d							
WILSON'S SNIPE Gallinago delicata					d							
PECTORAL SANDPIPER Pisobia maculata				d	d							
SEMIPALMATED SANDPIPER Ereunetes pusillus				d	d							
SOLITARY SANDPIPER Helodromas s. solitarius				d	d			t				
SPOTTED SANDPIPER Actitis macularia				d	d			t				
KILLDEER Oxyechus vociferus				d	d							
BOB-WHITE Colinus v. virginianus	s								d	t		
MOURNING DOVE Zenaidura macroura carolinensis	s					d		d	d	d		
MISSISSIPPI KITE Ictinia mississippiensis			d?									
MARSH HAWK Circus hudsonius								t				
RED-TAILED HAWK Buteo b. borealis										d		
BROAD-WINGED HAWK Buteo platypterus									d			
SPARROW HAWK Falco s. sparverius								d				

	1	2	3	4	5	6	7	8	9	10	11	12
TOWHEE Pipilo e. erythrophthalmus						t			d	s		
CARDINAL Cardinalis c. cardinalis						d		d	d	d		*
ROSE-BREASTED GROSBEAK Zamelodia ludoviciana						s		s		s		*
INDIGO BUNTING Passerina cyanea		d				s	d	s		t		
DICKCISSEL Spiza americana	d	t				s						
SCARLET TANAGER Piranga erythromelas										d		
PURPLE MARTIN Progne s. subis			s									
CLIFF SWALLOW Petrochelidon l. lunifrons			d									
TREE SWALLOW Iridoprocne bicolor			d					d				
BANK SWALLOW Riparia riparia			d					s			d	
MIGRANT SHRIKE Lanius ludovicianus migrans						d						
RED-EYED VIREO Vireosylva olivacea								d		d		
WARBLING VIREO Vireosylva gilva						s		d	d	d		*
YELLOW-THROATED VIREO Lanivireo flavifrons								d		l		
PROTHONOTARY WARBLER Protonotaria citrea								d				
KENTUCKY WARBLER Oporornis formosus								d				
MARYLAND YELLOW THROAT Geothlypis t. trichas		t					d	d		t		
HOODED WARBLER Wilsonia citrina								d				
REDSTART Setophaga ruticilla								d				
MOCKINGBIRD Mimus polyglottos	a					d			s			*
CATBIRD Dumetella carolinensis						s	d	s		s		*
BROWN THRASHER Toxostoma rufum	d					d		d	t	t		
CAROLINA WREN Thryothorus l. ludovicianus							d	d				
PARKMAN'S HOUSE WREN Troglodytes aedon parkmani								t				*
SHORT-BILLED MARSH WREN Cistothorus stellaris		d										
WHITE-BREASTED NUTHATCH Sitta c. carolinensis								t	d	d		
TUFTED TITMOUSE Baeolophus bicolor						s	d	s	t	t		
CAROLINA CHICKADEE Penthestes c. carolinensis						d		d	t	t		
BLUE-GRAY GNATCATCHER Polioptila c. caerulea								d				
WOOD THRUSH Hylocichla mustelina								d	d	d		*
ROBIN Planesticus m. migratorius		d	a	s		s		t	t	d		*
BLUEBIRD Sialia s. sialis			a			s		s		s		

	1	2	3	4	5	6	7	8	9	10	11	12
YELLOW-BILLED CUCKOO Coccyzus a. americanus						s		d	d	d		*
BLACK-BILLED CUCKOO Coccyzus erythrophthalmus						s		d				
KINGFISHER Ceryle alcyon			d					ds			d	
HAIRY WOODPECKER Dryobates v. villosus						s		d		d		
DOWNY WOODPECKER Dryobates pubescens medianus						s				d		
RED-HEADED WOODPECKER Melanerpes erythrocephalus			s			d		d	d	d		*
RED-BELLIED WOODPECKER Centurus carolinus								d		t		
NORTHERN FLICKER Colaptes auratus luteus						s		s	d	d		*
WHIP-POOR-WILL Antrostomus v. vociferus										t		
NIGHTHAWK Chordeiles v. virginianus			s							t		
CHIMNEY SWIFT Chaetura pelagica			d									
RUBY-THROATED HUMMINGBIRD Archilochus colubris												*
KINGBIRD Tyrannis tyrannis	a		s			s		d		t		
CRESTED FLYCATCHER Myiarchus crinitus						.		d	s	d		
PHOEBE Sayornis phoebe			s	d				d		d		
WOOD PEWEE Myiochanes virens								d	d	d		*
BLUE JAY Cyanocitta c. cristata						t		s	d	d		*
CROW Corvus b. brachyrhychos	s					s		s	d	s		
BOBOLINK Dolichonyx oryzivorus		d										
COWBIRD Molothrus a. ater						t		d		d		
RED-WINGED BLACKBIRD Agelaius p. phoeniceus		d					d	d		t		
MEADOWLARK Sturnella m. magna	s?	d										
WESTERN MEADOWLARK Sturnella neglecta	d											
ORCHARD ORIOLE c Isterus spurius						d		d		d		*
BALTIMORE ORIOLE Icterus galbula						s		d	s	d		*
BRONZED GRACKLE Quiscalus quiscalus aenus		s	s	s		s		d	s	s		
GOLDFINCH Astragalinus t. tristis						s		t	t	t		
VESPER SPARROW Pooecetes g. gramineus	d					s						
LARK SPARROW Chondestes g. grammacus	d					s						
FIELD SPARROW Spizella p. pusilla						d						
ENGLISH SPARROW Passer domesticus	t							a				*
SONG SPARROW Melospiza m. melodia							d	s				

OBSERVATIONS ON THE SPRING MIGRATION (1910) AT ANN ARBOR, MICHIGAN.

BY A. D. TINKER.

The following series of notes is a compilation of the records secured by Messrs. N. A. Wood, F. O. Novy, and the writer during the past spring. One or another of the party, and sometimes all, were in the field daily from the first of March to the last of May, making observations on the progress of the migration and taking specimens of the rarer species. Nearly all of the field work was done in the immediate vicinity of Ann Arbor. Mr. Wood made an occasional trip to Portage Lake, Washtenaw County, securing records of water-birds that otherwise would not have been noted.

A great many of the weather conditions prevalent during the spring of 1910 were quite similar to those of the corresponding season of 1907. However, the cold waves this year did not have the same effect upon the migration as in 1907. It will be well remembered that during that spring bird-life in general, and warblers in particular, were very abundant here and prolonged their stay to an unusual extent. This was especially true of the later migrants (Wood—Auk, vol. xxv, page 10). But this year there was no such abundance of individuals of the various species, although about the usual number of species were recorded. In fact, the migrants last to arrive, that is the great majority of the warblers, and some of the sparrows and thrushes, were rather scarce, while others were not noted at all. Whether this discrepancy was due to the destructive force of the heavy storms that took place along the Gulf States when the migration was at its height in that region or not must remain an open question. It is also quite possible that other forces combined to influence the migrating hosts to such an extent as to cause them to pass on without stopping here, as is their custom. Whatever the causes may have been, field-work throughout the entire season gave abundant evidence of the fact that there was a great falling off in the number of individuals of some of the species.

The first positive evidence of the spring migration was recorded on March 2 and 3, when there was a decided rise in the temperature, resulting in the disappearance of nearly all of the snow, and by the sixth of the month the open ground was free from snow. From the first to the sixth the prevailing winds were southerly, and during this period the Belted Kingfisher, Red-winged Blackbird, Marsh Hawk, Robin, Bluebird, Killdeer, Meadowlark, Mourning Dove, Cedar Waxwing, Canada Goose, Bronzed Grackle, American Golden-eye, and Canvas-back Ducks made their appearance. This constituted the first bird-wave of the season.

On March 7 there was a return of low temperature and northerly winds, with frequent snow flurries, practically putting a stop to all northward movements of the birds. March 10 witnessed a return of mild weather, which continued, with some slight changes, throughout the balance of the month. During this period from March 7 to 30 there was a gradual movement of the birds to the north, with heavier waves of migration on March 10, 19, 25, 27 and 28. None of these, however, brought in as many new arrivals as the first wave of the season. The total number of new arrivals noted during March was thirty-seven. The entire month was warm and remarkably free from the sudden changes which usually make the month so disagreeable in this latitude. On the 30th there was a cold wave, with heavy frosts on the evening of the 31st.

April opened fair and warm, with south-west winds, but on the 7th there was a return of cold weather, with heavy frosts. However, on the 8th there was a warm wave, which continued, with some slight variations, up to the 16th of the month, when low temperatures prevailed again. This cold wave remained in force until the 29th, after which it was warm for the balance of the month. There was a steady migration throughout the entire month, but no decided waves were recorded until April 12, and then not again until the 16th. The heaviest migration wave during the entire month took place on the 30th, when eight new species were recorded and the

ranks of the ones already on the ground were greatly augmented. During the entire month forty-four new arrivals were noted, only seven more than were recorded in March, which had an exceptionally large number this year.

The first three days of May were rather unfavorable to migration, but on the fourth there was a warm wave, which brought in six new migrants and added greatly to the species already here. This warm weather continuing to the twelfth resulted in a steady migration, which apparently reached its height on the evening of the 10th. A cold wave struck here on the 12th, but was replaced by a warm one on the evening of the 13th. With slight variations the balance of the month was fairly warm and favorable to migration. During the entire month fifty-six new arrivals were recorded, some of which, as the Least Flycatcher, Sharp-shinned Hawk, Catbird, and Baltimore Oriole should have been noted during the latter half of April. There was a general migratory movement throughout the month, but the heaviest waves occurred on the 4th, 8th, 11th, 14th, 15th, 16th, 17th and 21st, and the last new arrival was noted on June 2. Although about the usual number of migrants were recorded during May there was a remarkable scarcity of individuals among a great many of the species. This was especially noticeable in the Magnolia, Chestnut-sided, Palm, Black-throated Blue, Tennessee, and Wilson warblers, as well as the Grey-cheeked Thrush, Dickcissel, and Least Flycatcher. On the other hand the Blue-headed Vireo, Bay-breasted Warbler, Golden-winged Warbler, and Grasshopper Sparrow were unusually numerous. But very few of the warblers prolonged their stay beyond the usual period, and the majority were here only a short time.

In the following list of 141 migrants the various species are arranged in the order of their arrival, the dates given being the earliest record for the year. Species marked with an -*- occur in limited numbers as winter residents, rendering it very difficult to determine the exact date of the first migrating individuals of these species. In view of this the

dates given after such species are approximately those of the first migrants. The 1909 and 1908 records are given as a basis for comparison.

LIST OF MIGRANTS.

	1910	1909	1908
*Prairie Horned Lark	Feb. 27	Mar. 7	Mar. 10
*Belted Kingfisher	Mar. 2	Mar. 27	Mar. 21
Red-winged Blackbird	Mar. 3	Mar. 6	Mar. 8
Marsh Hawk	Mar 3	Mar. 2	Mar. 8
*Robin	Mar. 4	Mar. 4	Mar. 5
Bluebird	Mar. 4	Mar. 4	Mar. 8
Killdeer	Mar. 4	Mar. 6	Mar. 12
*Meadowlark	Mar. 5	Mar. 1	Mar. 8
*Flicker (Northern)	Mar. 5	Mar. 6	Mar. 22
*Mourning Dove	Mar. 5	Feb. 22	Mar. 18
*Cedar Waxwing	Mar. 5	Feb. 28	Mar. 8
Canada Goose	Mar. 5	Mar. 20	Feb. 16
Bronzed Grackle	Mar. 5	Mar. 7	Mar. 9
Golden-eye	Mar. 6	Mar. 7	Mar. 9
*Crow	Mar. 6	Feb. 21	Mar. 8
Canvas-back Duck	Mar. 6		Apr. 4
*Song Sparrow	Mar. 6	Feb. 21	Mar. 15
Lesser Scaup Duck	Mar. 8	Mar. 13	Mar. 21
Rusty Blackbird	Mar. 10	Mar. 7	Mar. 12
Herring Gull	Mar. 10	Mar. 31	Feb. 2
*Sparrow Hawk	Mar. 10	Mar. 6	Mar. 7
Red-head Duck	Mar. 10		Apr. 4
*Golden-crowned Kinglet	Mar. 11	Mar. 18	Mar. 3
Wilson Snipe	Mar. 12	Apr. 18	Apr. 4
Red-tailed Hawk	Mar. 19	Mar. 7	Mar. 12
Towhee	Mar. 19	Mar. 26	Mar. 15
Phoebe	Mar. 20	Mar. 27	Mar. 13
Cowbird	Mar. 20	Mar. 23	Mar. 12
Yellow-bellied Sapsucker	Mar. 24	Apr. 4	Mar. 27
Fox Sparrow	Mar. 25	Mar. 8	Mar. 22
Hermit Thrush	Mar. 25	Apr. 5	Mar. 24
Vesper Sparrow	Mar. 25	Apr. 4	Mar. 24
Tree Swallow	Mar. 25	Mar. 27	Mar. 29
Buffle-head Duck	Mar. 26	Apr. 11	Mar. 29
Chipping Sparrow	Mar. 27	Apr. 3	Mar. 24
Field Sparrow	Mar. 27	Apr. 2	Mar. 28
Swamp Sparrow	Mar. 27	Apr. 7	Mar. 29
Baldpate	Mar. 28	Apr. 15	

Pied-billed Grebe	Mar. 28	Mar. 27	Mar. 12
Woodcock	Mar. 30	Mar. 28	Mar. 22
Osprey	Apr. 3	Apr. 11	Apr. 16
Ruby-crowned Kinglet	Apr. 3	Apr. 14	Apr. 14
Bittern	Apr. 4	Apr. 24	Apr. 4
Brown Thrasher	Apr. 4	Apr. 12	Apr. 9
Loon	Apr. 5	Apr. 5	Mar. 8
Red-shouldered Hawk	Apr. 8	Mar. 6	Feb. 22
House Wren	Apr. 8	Apr. 28	Mar. 29
Long-billed Marsh Wren	Apr. 10	May 31	May 9
Great Blue Heron	Apr. 10	Mar. 24	Mar. 20
Cooper's Hawk	Apr. 10	May 2	Mar. 23
Migrant Shrike	Apr. 11		Apr. 16
Myrtle Warbler	Apr. 12	Apr. 12	Apr. 19
Bank Swallow	Apr. 12	Apr. 23	Apr. 13
Barn Swallow	Apr. 12	Apr. 11	Apr. 13
Ruddy Duck	Apr. 12	Apr. 13	Apr. 13
*Black Duck	Apr. 12	Mar. 27	Mar. 28
*Mallard	Apr. 13		Apr. 12
Coot	Apr. 13	Apr. 10	Apr. 4
Purple Martin	Apr. 13	Apr. 18	Apr. 25
Spotted Sandpiper	Apr. 15	Apr. 20	Apr. 26
Bartramian Sandpiper	Apr. 15		
Grasshopper Sparrow	Apr. 16	May 19	May 23
White-throated Sparrow	Apr. 16	Apr. 18	Apr. 16
Pectoral Sandpiper	Apr. 16		
Rough-winged Swallow	Apr. 17	May 1	Apr. 29
Cliff Swallow	Apr. 17	May 1	Apr. 23
Greater Yellow-legs	Apr. 22	May 4	Apr. 7
Lesser Yellow-legs	Apr. 22	Apr. 18	Apr. 17
Solitary Sandpiper	Apr. 23	May 8	Apr. 27
Chimney Swift	Apr. 23	Apr. 24	Apr. 24
Horned Grebe	Apr. 23	Apr. 14	Apr. 12
Black-crowned Night Heron	Apr. 25		May 3
Winter Wren	Apr. 28	Mar. 7	Mar. 22
*Red-headed Woodpecker	Apr. 29	Apr. 4	Apr. 23
Virginia Rail	Apr. 29	Apr. 23	Apr. 22
Palm Warbler	Apr. 29	Apr. 28	Apr. 23
Yellow Warbler	Apr. 30	Apr. 28	Apr. 22
Black-throated Green Warbler	Apr. 30	May 6	Apr. 23
Black and White Warbler	Apr. 30	May 2	Apr. 19
Blue-gray Gnatcatcher	Apr. 30	May 2	Apr. 19
*Purple Finch	Apr. 30	Apr. 11	Mar. 8
Green Heron	Apr. 30	May 8	Apr. 22
Lark Sparrow	Apr. 30		May 15

Bobolink	Apr. 30	May 5	Apr. 22
Catbird	May 1	May 4	Apr. 13
Northern Yellow-throat	May 1	May 4	Apr. 25
Oven-bird	May 1	Apr. 25	May 9
Bonaparte's Gull	May 2		May 9
*Merganser	May 3	Mar. 27	Jan. 27
Blue-headed Vireo	May 3	May 6	
Sora Rail	May 3	Apr. 30	Apr. 13
Savannah Sparrow	May 4	Apr. 14	
Least Flycatcher	May 4	May 6	Apr. 26
Baltimore Oriole	May 4	May 1	Apr. 24
Pipit	May 4		
King Rail	May 4	June 24	
Sharp-shinned Hawk	May 4	May 2	Apr. 13
Wood Thrush	May 5	Apr. 25	Apr. 29
Rose-breasted Grosbeak	May 6	May 5	May 3
Warbling Vireo	May 6	May 6	Apr. 25
Louisiana Water-thrush	May 8	Apr. 28	Apr. 26
Sycamore Warbler	May 8		Apr. 26
Nashville Warbler	May 8	May 7	Apr. 27
Grey-cheeked Thrush	May 8	May 5	Apr. 25
Wilson's Thrush	May 8	May 6	Apr. 27
White-crowned Sparrow	May 10	Apr. 30	May 3
Kingbird	May 11	May 1	Apr. 26
Whip-poor-will	May 11	May 12	Apr. 19
Chestnut-sided Warbler	May 11	May 6	May 12
Red-breasted Nuthatch	May 11		
Crested Flycatcher	May 11	May 6	May 12
Red-eyed Vireo	May 12	May 12	May 12
Cerulean Warbler	May 13	June 6	May 16
Blackburnian Warbler	May 14	May 6	May 8
Golden-winged Warbler	May 14	May 6	May 15
Redstart	May 14	May 2	May 11
Indigo Bunting	May 14	May 15	May 15
Least Bittern	May 14	June 8	May 1
Black Tern	May 15	June 26	
Black-throated Blue Warbler	May 15	May 5	Apr. 25
Yellow-throated Vireo	May 15	May 6	Apr. 26
Turkey Vulture	May 15	June 6	May 10
Orchard Oriole	May 16	May 13	May 15
Tennessee Warbler	May 16	May 7	May 12
Common Tern	May 16	Apr. 24	Apr. 12
Magnolia Warbler	May 16	May 6	May 11
Olive-backed Thrush	May 17	May 2	May 2

Scarlet Tanager	May 17	May 7	May 11
Wood Pewee	May 17	May 16	May 2
Cape May Warbler	May 17	May 6	May 15
Ruby-throated Hummingbird	May 19	May 12	Apr. 25
Bay-breasted Warbler	May 21	May 14	May 13
Black-billed Cuckoo	May 19	May 18	May 16
Yellow-billed Cuckoo	May 21	May 29	May 16
Black-poll Warbler	May 21		May 15
Nighthawk	May 23	May 29	May 17
Northern Parula Warbler	May 24	May 12	May 16
Wilson's Warbler	May 24	May 18	May 15
Canadian Warbler	May 27	May 6	May 11
Connecticut Warbler	May 28		May 17
Mourning Warbler	June 2	May 25	May 24

BIRD NOTES FROM PINEHURST, NORTH CAROLINA.

BY C. J. PENNOCK.

Following is a summary of my notes taken at Pinehurst, Moore County, N. C., during a stay there from February 9, to March 17, 1910.

This attractive winter resort settlement is about seventy-five miles south of Raleigh, forty miles from the South Carolina state line, and nearly one hundred miles north-west from Wilmington, at or near the sea coast. The elevation is about 650 feet above sea level and is in the Long Leaf Pine (*P. taeda*) district. Until within twenty years or so turpentine making was the principal industry of the region. With the building of a railroad the timber has been largely cut off, and later, devastating fires of frequent recurrence have made a most desolate looking country of much of the surrounding region. The aspect is rolling and many small streams are present. The soil is sandy, and excepting in few instances agricultural improvement has made slight progress. *Pinus taeda, P. echinata,* White Oak (*Q. alba*), Post Oak (*Q. obtusiloba*), Black Jack (*Q. nigra*) on the higher lands, and Sweet-Gum (*Liquidambar styraciflua*), Black-Gum (*Nyssa multiflora* and *N. uniflora*), Magnolia glauca and Tulip-trees

(*Liriodendron tulipifera*) on the lower lands are the most common trees. Along the streams Holly (*Ilex opaca*), *Andromeda nitida*, and Catbrier (*Smilax rotundifolia*) abound, and Mistletoe (*Phoradendron flavescens*) is abundant.

There are few large bodies of original-growth timber within five or six miles of Pinehurst. Around Carthage, twelve miles distant, much old pine is still standing, and midway between these two towns is some fine oak woods. The village of Pinehurst is beautifully laid out with roads and walks, many of which are bordered with an abundance of close growing shrubbery, making attractive shelter for several species of birds, notably Mockingbirds and Myrtle Warblers, while Towhees, White-throated Sparrows and Cardinals are seen here frequently. Probably the berry-bearing shrubs had much to do with the abundance of birds in the village, for I saw but one Mockingbird outside of Pinehurst, while they were numerous therein, and a flock of Cedar Waxwings frequented the locality for some time, often alighting on the bushes to feed on berries. The species noted are for the most part what one would expect to find.

I attempted to cover the ground carefully for several miles adjacent to Pinehurst and believe that few winter resident species escaped my observations. The season was an unusually cold one there, as it was throughout eastern United States generally. This no doubt retarded the migration movement, for with the exception of a Nighthawk and a sudden influx of Chipping Sparrows little or no migration movement was noted.

1. *Podilymbus podiceps*.—Pied-billed Grebe.

This bird is reported as being frequently seen on McKenzie's pond, two miles from Pinehurst, some times four or five together. I saw one swimming there March 15th and another that had been shot March 1st.

2. *Anas platyrhynchos*.—Mallard.

One had been wing-tipped at McKenzie's pond. I saw it in the poultry yard at Pinehurst.

3. *Philohela minor*.—Woodcock.

Said to be rather abundant at times. I shot a male February 23. The only one I saw. It was seemingly close to breeding time.

4. *Oxyechus vociferus.*—Killdeer.

Three came down on the golf links March 7th and six were there March 16th.

5. *Colinus virginianus virginianus.*—Bob-white.

Quite abundant, even within the village limits. They are carefully protected, and hawks are trapped and shot to save the quail. Many visitors find good sport hunting them and fair bags are made.

6. *Zenaidura macroura carolinensis.*—Mourning Dove..

Abundant everywhere. On the rye field near the dairy I usually saw them in groups of eight to twenty. After March 2d some were seen in pairs, as if mated.

7. *Cathartes aura.*—Turkey Vulture.

An abundant species. Both species seem to be affected by the cold and were seldom a-wing until 9:00 to 10:00 a. m. when the mercury ranged low.

8. *Catharista urubu.*—Black Vulture.

Numerous, and a striking feature to a northern visitor. By their style of flight, contour, and one might say *general effect*, the two species of Vultures may be distinguished almost as far as they can be seen. My observations would indicate that the two species combined are not so numerous as is the Turkey Vulture in lower Delaware.

9. *Accipiter velox.*—Sharp-shinned Hawk.

I saw but one. It was after some quarry along a clump of bushes bordering a stream.

10. *Accipiter cooperi.*—Cooper's Hawk.

But one seen to be positively identified.

11. *Buteo borealis borealis.*—Red-tailed Hawk.

A pair were located one-half mile back of the Dairy along a small stream, and on March 10 I took one egg with incubation begun. Two or three other birds were seen.

12. *Buteo lineatus lineatus.*—Red-shouldered Hawk.

Two or three seen. All the large hawks are hunted closely, and steel traps are placed on high poles in exposed places. I was told they had formerly caught many "Chicken Hawks" in this way. I saw one Turkey Vulture and one Sparrow Hawk so entrapped.

13. *Falco sparverius sparverius.*—Sparrow Hawk.

Not very abundant. A lack of food supply no doubt was the reason, there being comparatively little cover for mice. The stomach of one shot contained remains of a White-throated Sparrow.

14. *Otus asio asio.*—Screech Owl.

For the reason just stated I surmise this is not an abundant

species about Pinehurst. I saw one sunning himself about 8:30 a. m. February 19, in the bright sunshine, the thermometer having marked 22° at 7 a. m.

15. *Bubo virginianus virginianus.*—Great Horned Owl.

Said to be rather common. One was captive in the park, taken near by in early winter, and others had been taken. They did not live amicably, I was told, and would sometimes fight to the death.

16. *Ceryle alcyon.*—Belted Kingfisher.

I saw one near the mill and they were reported as being rather common.

17. *Dryobates villosus audubonii.*—Southern Hairy Woodpecker.

I saw but four or five. I referred all to this form. One shot measured 8.54 inch, wing 4.50 inch.

18. *Dryobates pubescens pubescens.*—Southern Downy Woodpecker.

Seemingly more abundant than was the preceding species. Three I shot measured, length, 6.25, 6.00, 6.00 inches; wing, 2.25, 2.62, 2.50.

19. *Dryobates borealis.*—Red-cockaded Woodpecker.

Fairly abundant; noted on eight different days, and twenty-one individuals counted. Possibly a few of these were seen twice.

20. *Sphyrapicus varius varius.*—Yellow-bellied Sapsucker.

Not numerous. I did not see above six of them.

21. *Melanerpes erythrocephalus.*—Red-headed Woodpecker.

Seen only in the village, where there were two or three, evidently young of the preceding year. By March 13 the head was showing bright red.

22. *Centurus carolinus.*—Red-bellied Woodpecker.

Saw one only. It was in the oak woods eight miles northeast of Pinehurst, March 4, my only trip to this region. They appeared absent from the pine lands about Pinehurst.

23. *Colaptes auratus auratus.*—Flicker.

Abundant. Seen about the village and over the country generally. By February 23 they had become quite noisy and were love-making on March 2.

24. *Chordeiles virginianus virginianus.*—Nighthawk.

I was surprised to see a single bird on February 22 flying over the village. It was not over fifty yards distant and in full light. On March 14 I heard one of these birds overhead towards evening as I passed through the Park grove, but failed to see it. It has been suggested that this may have been a bird unable to make the southward flight last fall and remained north throughout the winter. Its appearance at the place and time is certainly remarkable

25. *Otocoris alpestris practicola.*—Prairie Horned Lark.

A small flock was on the rye field near the Dairy. I shot one February 12.

26 *Cyanocitta cristata cristata.*—Blue Jay.

Quite common everywhere. Appeared to be mating March 14.

27. *Corvus brachyrhynchos brachyrhynchos.*—Crow.

Not abundant; never saw more than six at one time. Usually three or four were together.

28. *Molothrus ater.*—Cowbird.

A flock of 300 or more appeared March 8 and remained, at least, until we left, March 16. They fed on the open fields and lots in and close to the village, keeping in a compact body on the ground, those from one side flying over the others and alighting on the opposite side close to their companions.

29. *Sturnella magna magna.*—Meadowlark.

Abundant all through the more open parts of the village, on the golf links, frequently seen in the open woods in flocks of irregular numbers up to thirty, and sometimes a single bird was flushed in seemingly unsheltered localities.

30. *Euphagus carolinus.*—Rusty Blackbird.

A flock of about 20 remained several weeks along the small stream a quarter of a mile below the power plant. Were still there March 16.

31. *Astragalinus tristis tristis.*—Goldfinch.

Never seen abundantly. At several times in small numbers.

32. *Poœcetes gramineus gramineus.*—Vesper Sparrow.

Abundant. They were usually seen in flocks. Sometimes 50 to 100 together.

33. *Passerculus sandwichensis savanna.*—Savannah Sparrow.

Only a few seen.

34. *Zonotrichia albicollis.*—White-throated Sparrow.

Quite common. Found in shrubbery in the village, and especially in the low borders of streams where cover was abundant. They commenced singing softly March 6.

35. *Spizella passerina.*—Chipping Sparrow.

First seen March 2, and became abundant on the 8th. Thereafter at times in flocks of twenty or more.

36. *Spizella pusilla pusilla.*—Field Sparrow.

Abundant. Frequently heard singing after February 27.

37. *Junco hyemalis hyemalis.*—Junco.

Very abundant. Found almost everywhere, and in flocks of a few to 100 or more.

38. *Melospiza melodia melodia.*—Song Sparrow.

Commonly distributed.

39. *Melospiza georgiana.*—Swamp Sparrow.

Not abundant; rarely saw more than one in a half day's tramp.

40. *Passerella iliaca iliaca.*—Fox Sparrow.

I found small colonies in a few places.

41. *Pipilo erythrophthalmus erythrophthalmus.*—Towhee.

Rather common; usually found near the small streams. A few in the shrubbery in the village.

42. *Cardinalis cardinalis cardinalis.*—Cardinal.

Common wherever there were favorable surroundings.

43. *Bombycilla cedrorum.*—Cedar Waxwing.

A flock of over 200 appeared February 27 and remained at least until March 16. They were sometimes seen divided in bands of twelve to fifty, two or more of which would occasionally unite and sometimes all appeared to be together. They frequented the trees and shrubbery through the village.

44. *Lanius ludovicianus ludovicianus.* — Northern Loggerhead Shrike.

There were three or four pairs in the village. I saw none elsewhere. The two shot measured: length, 8.34 and 8.63; wing, 3.75 and 3.63 inches.

45. *Dendroica coronata.*—Myrtle Warbler.

Abundant everywhere in the village, along streams, and in the small oaks on high sandy ground.

46. *Dendroica vigorsi.*—Pine Warbler.

First seen and heard singing February 18. After March 4 they were singing frequently.

47. *Anthus rubescens.*—Pipit.

A flock of 100 or more were on the rye field at the Dairy. First seen February 10, and at intervals to March 16.

48. *Mimus polyglottos polyglottos.*—Mockingbird.

It was a pleasure to find these birds abundant through the village. I estimated there were twenty pairs of them in about one-half mile square, and I saw but a single bird elsewhere. The first song was heard February 12, a faint, whispered ripple in the throat. As the weather grew warmer the songs increased in volume and frequence, but a cold windy day checked the singing promptly. At first and for several days the songs were low and sweet, scarcely to be heard beyond a distance of fifty feet, and the bird did not open his bill in thus singing. With warmer days the song came with open bill and poured forth in volume. At times three or four birds could be heard in full chorus, and the various species imitated were almost legion. The first early low, sweet song seemed to contain no mimicry and was extremely pleasing. Great difference was observed in the vocal powers of different individuals. One near the station and another at the post office were

notable for continued song and extensive range in mimicry.

49. *Dumetella carolinensis.*—Catbird.

A few were seen along streams where shelter was abundant.

50. *Toxostoma rufum.*—Brown Thrasher.

Seen only along streams, and not abundant. I did not hear them singing.

51. *Thryothorus ludovicianus ludovicianus.*—Carolina Wren.

Rather abundant, and usually in pairs.

52. *Thryomanes bewicki bewicki.*—Bewick's Wren.

The last day of my stay, March 16, the only one noted was seen in the village near the power plant.

53. *Sitta carolinensis carolinensis.*—White-breasted Nuthatch.

Not abundant. I saw nine birds only.

54. *Sitta pusilla.*—Brown-headed Nuthatch.

Seemingly more abundant than the preceding. During the latter part of my stay they became quite active and indicated a mating spirit.

55. *Baeolophus bicolor.*—Tufted Titmouse.

Abundant.

56. *Penthestes carolinensis carolinensis.*—Carolina Chickadee.

Quite common.

57. *Regulus satrapa satrapa.*—Golden-crowned Kinglet.

Only one positively identified.

58. *Regulus calendula calendula.*—Ruby-crowned Kinglet.

Several seen.

59. *Hylocichla guttata pallasi.*—Hermit Thrush.

Frequently seen along the streams and occasionally on high ground.

60. *Planesticus migratorius migratorius.*—Robin.

Abundant. Occurred in flocks of five or six to forty or more.

61. *Sialia sialis sialis.*—Bluebird.

Common. I found them widely distributed and generally two to five or more in company.

The following species, while not seen, are given on seemingly reliable evidence:

1. *Gavia immer.*—Loon.

The "boys" at McKenzie's mill described this species accurately, even to the cry. One had been on the pond for several days and was finally killed.

2. *Lophodytes cucullatus.*—Hooded Merganser.

Several immature birds and at least one adult had been seen on McKenzie's mill pond. The description as to size, bill and crest was beyond question.

3. *Ardea herodias.*—Great Blue Heron.

The residents told me it was occasionally seen on the mill pond.

4. *Meleagris gallopavo silvestris.*—Wild Turkey.

Mr. Caddell, an intelligent resident, told me he saw one about February 20, six miles north of Pinehurst. Others told me they were yet sometimes shot in the county.

5. *Pandion hiliaëtus carolinensis.*—Osprey.

A few come in the spring to the mill pond and are seen plunging for fish.

6. *Phlœotomus pileatus pileatus.*—Pileated Woodpecker.

Several of the older residents know this bird well and report it as still to be seen in the back districts where larger bodies of timber yet stand. They call it Logcock, Blackcock, and Woodcock.

The following table indicates the number of observations on each species and the total of individuals. In a few instances this is misleading, without some explanation. I made constant effort to avoid a recount on any single trip; when returning over the outward bound route I counted only new species, but of course in starting out each day from the village I frequently recounted some seen on former days. This is true in regards to the Mockingbird, Robin, Junco, Field Sparrow, Cowbird, Cedar Bird, Rusty Grackle, American Pipit, and probably a few others. In general, however, it will indicate comparative abundance much more accurately than would be the case had I used the terms "common," "abundant," or "rare":

Pied-billed Grebe	2	2
Mallard	1	1
Woodcock	1	1
Killdeer	3	12
Bob-white	12	65
Mourning Dove	44	414
Turkey Vulture	45	191
Black Vulture	23	181
Sharp-shinned Hawk	1	1
Cooper's Hawk	1	1
Red-tailed Hawk	4	7
Red-shouldered Hawk	5	5
Sparrow Hawk	6	7
Screech Owl	1	1
Great Horned Owl	1	1
Belted Kingfisher	1	1

Nighthawk	2	2
Hairy Woodpecker	4	4
Downy Woodpecker	12	12
Red-cockaded Woodpecker	9	21
Red-headed Woodpecker	3	3
Red-bellied Woodpecker	1	1
Yellow-bellied Sapsucker	5	5
Flicker	56	89
Prairie Horned Lark	1	16
Blue Jay	22	29
Crow	39	74
Cowbird	4	680
Meadowlark	45	364
Rusty Blackbird	10	91
Goldfinch	7	24
Vesper Sparrow	18	225
Savannah Sparrow	2	11
Chipping Sparrow	15	87
White-throated Sparrow	26	92
Field Sparrow	32	209
Junco	85	1714
Song Sparrow	54	110
Swamp Sparrow	6	8
Fox Sparrow	9	25
Towhee	18	20
Cardinal	37	50
Cedarbird	16	1196
Loggerhead Shrike	9	11
Myrtle Warbler	49	142
Pine Warbler	21	22
Pipit	8	331
Mockingbird	84	112
Catbird	3	3
Brown Thrasher	7	7
Carolina Wren	33	35
Bewick's Wren	1	1
White-breasted Nuthatch	6	9
Brown-headed Nuthatch	12	23
Tufted Titmouse	38	49
Carolina Chickadee	23	38
Golden-crowned Kinglet	1	1
Ruby-crowned Kinglet	6	6
Hermit Thrush	26	27
Robin	37	318
Bluebird	75	117

SOME NOTES FROM PICKAWAY COUNTY, OHIO.

BY B. R. BALES, M. D., CIRCLEVILLE, OHIO.

In transcribing the following notes, it might be well to state for the benefit of those readers who do not reside in Ohio, that Pickaway County lies in the south-central portion of the state, and that Circleville, the county seat, is about thirty miles south of Columbus, the capitol.

Barn Owl (*Strix pratincola*).—Since writing my article on this species, (Wilson Bulletin Vol. XXI, No. 1. Pp 35), I have observed the following instances of its occurrence here:—January 21st, 1909; a male that had been shot at the ice house, along the Ohio Canal, within the city limits, was brought to me. It was in good condition and had two mice in its stomach. January 27th, 1909; a male was found along a road side, seven miles north of Circleville. The bird was wounded in the wing and breast, and was very much emaciated. November 10th, 1909; a wounded female was found flapping feebly about on the ground near Stage's Pond, five miles north of Circleville. It likewise was much emaciated. November 18th, 1909; a female that had been shot from a tree along Darby Creek, three miles north of Circleville, was brought to me. The stomach contained the remains of two mice. April 10th, 1910; discovered a nest in an elm tree along Darby Creek, three miles west of Circleville. This tree stands not over one hundred and fifty yards from the tree in which Dr. Howard Jones took the first Ohio set of this species. The eggs of the 1910 set were laid upon the rotted wood at the bottom of a cavity four feet deep and a foot and a half in diameter. The cavity was in the broken-off top of an elm tree, forty-five feet from the ground, was open at the top and contained five eggs, in which incubation varied from one-third to one-half. Both birds were in the nesting cavity when discovered and remained there until the climber had almost reached the cavity, when they emerged and flew to a nearby tree for a moment as if to get their bearings, when they flew to the tree in which the first Ohio set was taken

and disappeared within the cavity. This tree is well shown in Dawson's "Birds of Ohio" Pp. 373. The set taken by Dr. Jones was taken on May 27th, 1897, and fully one-half of the specimens of this species that have been brought to my notice have been taken in this immediate vicinity. It would seem as though most of the birds had been raised in one or the other of the two cavities. I have never heard of this bird showing a special attachment for a certain locality, but this case extending over a period of thirteen years, would seem to indicate, in this case at least, that such is the case. November 14th, 1910; a female that was shot from a barn three miles east of Circleville, along Hargus Creek, was brought to me by a farmer who was "afraid it would take his chickens," unaware that he had killed a mouser that was worth a half dozen cats.

Marsh Hawk (*Circus hudsonius*).—On May 19th, 1910, I had the good fortune to discover the fourth authentic set of this species ever taken in Ohio, (according to Dawson's "Birds of Ohio.") I was approaching a boggy meadow overgrown with marsh grasses in search of rail nests, when I saw a hawk perched upon a fence post in the distance, and remarked to my companion that the bird looked like a Marsh Hawk, but soon dismissed the thought from my mind as improbable. Proceeding well into the centre of the swamp, I flushed the female from her four mud stained eggs. The nest was built upon the ground, surrounded by a number of short, stunted wild rose bushes, where there was a slight elevation above the surrounding marsh, and the ground was therefore dry. The nest was composed mainly of "tassels" from the tops of corn stalks; several weed stalks entered into the composition of the nest, among which was a stalk of teasle and a large smart weed stalk. A tuft of corn silk lay at the edge of the nest. The female hovered about for a few moments, but soon joined the male, who had remained at a distance, when both flew away. The eggs were fresh.

Snowy Owl (*Nyctea nyctea*).—A specimen of this species

was taken near Ashville, eight miles north of Circleville, November 20th, 1910.

Short-Eared Owl (*Asio accipitrinus*).—This species is abundant in winter, but I have taken their nests in but one year — 1906 — in which year I took four sets. The first set was taken on April 21st and consisted of four eggs; the next set was taken on May 1st, and also consisted of four eggs; the third set was taken on May 11th, and consisted of five eggs, while the last set consisted of six eggs and was found on May 19th. All of these sets were found within a radius of one and one-half miles, and were in corn fields close to Darby Creek, near the trees where the two sets of Barn Owl were taken. All of the nests but one were placed upon the ground, with but a few bits of sticks and corn stalk, and an occasional feather from the mother bird to serve as a nest. The exception to this rule was built upon a pile of drift, composed of corn stalks, sticks and trash. I have searched the breeding grounds carefully each year since 1906, but have been unable to discover another nest, although the birds are as abundant as usual during the winter months.

Double Crested Cormorant (*Phalacrocorax a. auritus*).—A male that had been shot three miles north of Circleville, along the Scioto River, was brought to me October 21st, 1909. There were two birds, but the other luckily escaped. A female was shot in almost the same locality on October 26th, 1910. This specimen was also brought to me. A specimen of this species was shot while swimming in the Ohio Canal, within the city limits, about six years ago, but I find I have no record of the date, but remember it was in Autumn.

Bonaparte's Gull (*Larus philadelphia*).—A specimen of this species was shot while flying about the pond near the ice houses, within the city limits, on November 17th, 1908.

Common Tern (*Sterna hirundo*).—A specimen of this species was shot at the State Dam across the Scioto River, three miles south-west of Circleville, on June 25th, 1908. I was told by several people that they had seen it for almost a

week at this place, before it was shot. It seems unusual to me that this species should be found away from a large body of water at this time of the year. The sex of this specimen was not determined.

Ring Necked Duck (*Aythya collaris*).—A female of this species was brought to me on February 17th, 1909. It was taken from the Scioto River. On March 11th, 1910, two females were brought to me and on March 16th, 1910, I obtained another female. All were shot from the Scioto River, near Circleville.

King Rail (*Rallus elegans*).—While Dr. Howard Jones in his "Nests and Eggs of the Birds of Ohio," mentions seeing young of this species in this county, the first set of eggs was taken May 21st, 1906. There were eleven eggs in this set. On May 23rd, 1907, I took two sets of this species, one of ten eggs and one of twelve. On May 25th of this same year, I found another set of ten, and on May 29th, a set of eleven. On May 20th, 1908, I found a deserted nest of this species containing two mud covered eggs. Excesive rains had raised the water in the swamp, and had flooded the nest. On May 22nd, 1908, at another swamp, I discovered a nest containing eleven eggs. On May 14th, 1910, I found a nest containing eleven eggs, and on May 19th another set of eleven. One who has never seen a set of these beautiful eggs in the canopied nest, cannot realize the beauty from a description. It must be seen to be appreciated.

Least Bittern (*Ardetta exilis*).—Rather common summer resident in suitable localities, especially at Calamus Pond, three miles west of Circleville. This pond, or swamp, is from one-fourth to one-half mile across and the water is from one to three feet deep. It is thickly dotted with buttonwood bushes. Wild rose thickets fringe the shores; saw grasses, tall water grasses and calamus or sweet flag (from which the pond receives its name) are found in its shallower places and cat tails further out. It is an ideal nesting place for this species; in June, 1907, I found fourteen nests between the fourth

and the twenty-first. The nests are mainly placed among the saw grasses in shallow water and are situated from six inches to two and one-half feet above water; eighteen inches is the average height. The nests are composed of saw grass blades, short lengths of smartweed stalks, slender twigs from the buttonwood, and about half the nests examined are lined with finer grasses; at the best the nests are very flimsy, frail and loosely put together. Occasionally a nest is found composed almost entirely of a tall round water grass, but nests so composed are always built in a clump of this variety of grass. Saw grasses are usually bent over to form a platform on which to build the nest; these grases are often bent over a small branch of buttonwood to give stability to the platform. An occasional nest is built among the diverging twigs of the buttonwood bush, much in the maner of a green heron nest, but nesting sites of this type are rare. The full complement of eggs is usually four or five, although I have taken highly incubated sets of three, and have seen nests containing six young. Fresh eggs have been taken between June 4th and June 21st, although on June 18th, 1908, I found two nests containing young. The young in the first nest discovered were likely almost a week old and were very odd looking fellows. They were covered with a yellowish down except about the eyes, where the greenish skin was bare; the legs were yellow with a green tinge on the dorsal surface. Another nest discovered the same day contained six young in which the pinfeathers were showing. It is doubtful if this nest would have been discovered, had I not seen one of the young birds clinging to one of the round water grasses fully a foot above the nest. While perched upon the slender, swaying water grass, they have a peculiarly pert and saucy look that is ludicrous in the extreme. They are excellent climbers and use their long necks and bills in climbing by hooking the head over the perch and using it as a sort of hook to aid them in scrambling up. The feet are very strong. The young in

this nest tried to peck my hand as I placed it above them; they acted like trained soldiers, all pecking at exactly the same time, as if at a word of command.

Mockingbird (*Mimus polyglottos*).—This species is be coming more common each year. Although straggling birds had been seen previous to this time, the first nest was discovered May 21st, 1907. It was placed among the diverging twigs in an osage orange hedge fence, four miles east of Circleville, along a much travelled road and contained four eggs. The next set taken in the county was taken by Mr. W. Leon Dawson, June 2nd, 1909. Mr. Dawson was spending the day with me and the birds, and while we were driving along a road, eight miles west of Circleville, we heard the male singing. A hedge fence grew along one side of the road, and as the cover was the right kind for nests of this species, Mr. Dawson began searching the hedge and soon found the nest, which contained four eggs apparently well along in incubation. I took another set of four of this species on June 1st, 1910, from a red haw bush in a blue grass pasture about a mile from where the Dawson set was taken. This locality has been noted for several years for its mockingbirds. One pair nesting near the residence of Mr. W. H. Reid, a close bird student, reared three broods in 1908. I shot a male from a wild rose thicket at Calamus Pond on February 21st, 1909. The stomach contained fruits and seeds of wild rose. The mockers that breed near Mr. Reid's arrived from the south, March 11th, 1908, and March 28th, 1910. All of the nests of this species that have come under my observation have been rather loosely put together, but all have been distinguished by having the lining of fine pale yellowish brown rootlets that contrast sharply with the dark body of the nest.

A PARADISE FOR LONGSPURS.

(Notes on the Birds of Addison, Illinois.)

BY G. EIFRIG.

First, a few words on the topography of this section. Addison is a small village, twenty miles west of Chicago, in Du Page County, hence it is in the prairies. which, however, at this point, reach their greatest altitude for this section of the state, namely, 350 feet. It is a rather prosaic, uninteresting region, being a purely agricultural district, with nothing but fields as far as one can see. There are next to no trees not even along ditches and creeks, excepting a few tall cottonwoods surrounding the farm-yards, and a rather large wood a half mile northeast of my residence. All around us there is more woodland to be seen, as e.g. at Glen Ellyn, about four miles from here, the home of our secretary, Mr. B. T. Gault, which is a very pretty, park-like place. The Addison woods is two miles long by one mile wide, and is mainly composed of Burr, Scarlet, Red, and White Oaks, Hickory, Elm, Ash, and Hazel, and several species of *prunus* bushes.

In the open parts as well as in the woods nearly every depression is a small swamp, or even pond. Those in the woods are grown over with Water Hemlock (*Cicuta maculata*) and Button bush (*Cephalanthus occidentalis*), the latter giving them a somewhat southern appearance. Here the Green Herons build, Yellow-throats are plentiful, and I even found a female Prothonotary Warbler at the edge of one of them, a rarity for Du Page County. The swamps in the open are overgrown with cattails, *sparganum, scirpus,* etc., and are difficult to negotiate, owing to the soft bottom, and to the hummocks and holes made by the cows, which are let in in the fall and late summer, when there is little if any water in these places. The last summer (1910) being exceptionally dry here, all swamps and ponds were dry, so that in one at least the Pied-billed Grebes, which had been there, had to allow one a good look at them, as the water was too shallow for diving, and later disappeared entirely. One that I cornered

lay motionless across a clump of old reeds, etc., thereby rendering itself nearly invisible. Here are also the homes of *Rallus elegans, virginianus,* and the Sora, as well as hordes of Redwings, Long-billed and Short-billed Marsh Wrens, and Swamp Sparrows. Several times I also flushed a Short-eared Owl. But these wet places contain rarer things than all these. March 28 I took a Henslow's Sparrow, and August 31 a Nelson's in one of them. Numerous springy places in pastures or near the sloughs harbor many Wilson's Snipes, Pectoral and Red-backed Sandpipers in migration, and a few Killdeer all summer. Rarities for this country that I saw here, were a Wilson's Phalarope (*Steganopus tricolor*) on May 12, a Black Tern on July 20, and near by a flock of about fifteen Golden Plover on May 10. It is surprising how late and how early Greater Yellow-legs are here; the last were here May 23, and the first I noticed already July 19.

When an ornithologist goes to another place to stay temporarily or permanently, he always looks forward with keen expectation and pleasant anticipation, to find out what species of birds, hitherto not seen in the flesh, the new places will bring him. So it was in my case. Naturally northern Ontario is a more interesting place, both scenically and biologically, than Du Page County, Illinois. And some birds I expected to see here without going far, did not materialize till now, e.g. the Yellow-headed Blackbird, Dickcissel, Tufted Titmouse, Bob-white, Cardinal, Chat, Bank Swallow, etc. Even the Wood Thrush is rare here in summer; also the Whippoorwill and the Rose-breasted Grosbeak. But still there are surprises awaiting one, at least during migration, and mainly in the large woods, with its mysterious little sloughs. A rarity in most places was here in surprising numbers last spring, namely the Gray-cheeked Thrush. May 24, I must have seen at least 200. There was a noticeable disparity in size, too, among them (Bicknell's ?)—. I also took Tennessee, Cerulean, Connecticut, Blue-winged, Palm, and other

warblers here. The other warblers and the flycatchers are here in proportion. The Blue-gray Gnatcatcher is also here, even as a breeder.

One of the most interesting finds I made here, is a herony of Black-crowned Night Herons. It consisted of about thirty nests in a wet corner of the woods, adjoining a field. They were from thirty to sixty feet up in ash trees, and on June 11 contained two to four eggs each; no young were noticed. Another member of the same family that I was glad to meet with here in the swamps mentioned above, is the Least Bittern, and naturally its larger congener also. On the other hand such otherwise common birds like the Mourning Dove, Sparrow Hawk, and even the Kingfisher are strangely absent, although for the latter a creek with minnows and steep banks here and there, meanders through the landscape.

In the line of birds of prey, we have here the Red-shouldered, Red-tailed, Marsh, Cooper's, and Broad-winged Hawks, the last two rare. The Barred Owl is said to be in the woods, and the Screech Owl is often heard singing its to most people unpleasant song from orchards and shade trees. A few Ruffed Grouse (*Bonasa umbellus*) are said to be still in the woods nearby, and Prairie Chickens are met with now and then. One day I flushed a flock of about twenty-five a few miles from here — a new and interesting experience for me — and I was surprised to see how high they would rise — a flight quite different from that of the Ruffed Grouse; more like that of a large Meadowlark.

In the finch family we have quite a selection: Goldfinch and Indigo Buntings. Song, Swamp, Vesper, and Savanna Sparrows, all common breeders. I gladly welcomed again an old acquaintance from Maryland, that I had missed in Canada, the Towhee. Of this I found a nest on May 28, containing two eggs of the owner and three Cowbird's eggs. Yes, the finch family brings us to the heading of these notes. As a place for Longspurs prosaic Addison shines. About the end of October they come in many small flocks and take possession of

the empty fields, i.e. empty for us, but full for them, namely full of weed-seeds. They prefer the high wind-swept fields, and can often be seen flying to and fro, from one rise to another. Some days they are tame, allowing of close approach, on others they are extremely shy. Last spring, with its cold weather, they stayed at least till May 5, when I took several in nearly full nuptial dress. Usually they are gone before this, as I am told. They are difficult to see when on the ground, especially in their winter dress. The flocks seem to be made up of *lapponcus* mainly, although on April 20 I saw one Smith's Longspur (*C. pictus*). Nearly every field contains one or several little flocks, of from five to twenty-five each, busily gleaning the weed seeds, of which their stomachs and crops, when taken, are full to bursting. On their restless days, or when being scared up from several fields, the air is sometimes literally alive with them, when also flights of up to a hundred can be seen. Their flight is somewhat erratic, but nevertheless, as well as its call and flight notes, characteristically finch-like. Other members of the finch family are the White-throated, White-crowned, Fox, Lincoln's and Tree Sparrows; also Juncos, most of which are, of course, only migrants, while the last two are to some degree winter residents. Thus, to-day (December 17), I saw a flock of Tree Sparrows, Juncos and Redpolls. Early in November, Pine Siskins were common here, and a few Pine Grosbeaks were seen, which, together with the fact that Evening Grosbeaks had been seen at several places in the neighborhood, makes me think that somewhat abnormal food or other conditions must be prevailing up north, to bring these hardy northern birds down here so early.

LECONTE'S SPARROW AT HOME NEAR CHICAGO.

BY GERARD ALAN ABBOTT.

Leconte's Sparrow has been regularly observed and recorded from the Calumet region, around Chicago in April. From then until September most of the migratory sparrows are north of Illinois and Leconte's has been classed only as a transient in this vicinity. Personally I neglect small birds in my zeal to follow and study the water fowl. Students generally manifest a preference for the large birds, but as their experience afield becomes more scientific, insectivorous and seed-eating birds receive attention.

On May 21, 1910, the afternoon was cool and rainy. I was searching for Bartramian Sandpipers along the grassy fields bordering a tributary of the Calumet River. The locality was a favorite haunt for Henslow's Sparrow, spring and summer. I heard several indistinct chirps as I moved slowly up the incline, carefully examining each clump of grass. One little bird was particularly demonstrative, and such a ventriloquist I did not catch a glimpse of him.

When two hundred yards above the marsh, I stooped intuitively and parted the vegetation, exposing in a little clump of coarse grass, a neat little nest supported on a mass of last year's herbage two inches high. The structure was deep and composed entirely of fine, dry grass, very substantial for a "Ground Bird's Nest."

When I returned to this meadow four days later, the nest was more difficult to locate than before, as I had misjudged the distance of my land marks. Upland Plover and Meadow Lark both reluctantly exposed their eggs, while I explored tussock after tussock trying to locate the little Sparrow's nest. Finally the sign loomed up before me and I was delighted to peer once more into the coveted clump and observe that the nest now contained two freshly laid eggs of Leconte's Sparrow.

May 28, 1910, I collected the set. The bird flew from the

nest when I was within ten feet of her. The flight was short and feeble as she darted slowly over the weed stalks, soon dropping into cover. The male though making himself heard, was not conspicuous in any other way.

The eggs show a distinct individuality. Unlike the products of either the Grasshopper or Henslow's Sparrows, the background is ashy gray, thickly and rather heavily blotched with shades of brick red and light brown. In shape they resemble the typical Bobolink's egg. In size they are smaller than any of our other meadow birds except the Short-billed Marsh Wren.

June 12, 1910, my friend, Mr. Ford, had the good fortune to find another set of four within seventy-five yards of this spot. The nest and eggs closely resembled the former set. The eggs are slightly lighter in coloration and the nest less elaborate. This, I am quite sure, was a second set from the same bird. Mr. Ford, like myself, realized the value of such a find and spent some little time in watching the parent and noting her actions.

June 26, 1910, Charles Richards located a nest and three eggs of Henslow's Bunting in the same area. This bird is not an uncommon summer resident here and I presume at least half a dozen pair nest along the river bottom in this neighborhood every June.

Unlike Leconte's, this nest was placed on the ground and lacked the substantial appearance shown in the general construction of the two nests of Leconte's sparrow. The eggs of the Henslow's Sparrow had a beautiful light green background which partially disappeared when the contents of the eggs were removed. The spots are almost entirely clustered about the larger half of the egg and tend to form a distinct wreath. The markings are in the form of bright reddish specks and dots. In shape the eggs are quite pyriform.

AN OHIO NEST OF THE BLACK AND WHITE WARBLER.

BY B. R. BALES, M. D., CIRCLEVILLE, OHIO.

It was while on a collecting trip in Hocking County, Ohio, on May 29th, 1910, that I discovered this rare Ohio set. A Ruffed Grouse had been flushed, and while searching for a possible nest, my companion called my attention to a small bird that he had flushed from the ground. I immediately recognized it as a female Black and White Warbler (*Mniotilta varia*. In a few moments she flew to the base of a small sapling and disappeared. Close search soon revealed her upon the nest. I had a small stick in my hand and pushed it toward her to flush her from the nest; as the end of the stick almost touched her, she left the nest and hopped up and perched upon the stick, the other end of which I held in my hand. She would have been a model subject for the camera, but unfortunately, I did not have it along.

The nest was sunk into a depression in the ground at the base of, and overhung by, the roots of a slender sapling growing upon a steep hillside that was overgrown with underbrush and saplings, and was composed of dead leaves, strips of inner bark of some tree and slender strips of grape bark, nicely cupped and lined with hairs of raccoon and opossum.

It contained five eggs that were advanced in incubation, in fact, they would have hatched in another day; in color they were creamy white, speckled and spotted and blotched with red-brown and lavendar. The markings form a wreath at the larger end; the deep shell markings of lavendar are very prominent at the larger end also.

Incubation being so far advanced, it was difficult to save them, in fact, one was broken, two cracked and the other two chipped in blowing.

The measurements in inches of the four eggs saved, are as follows:— .69 x .49, .68 x .49, .68 x .49, .68 x .50.

The fact that the eggs were almost at the point of hatch-

ing, and that a steady drizzle of rain was falling at the time, probably accounts for the extraordinary boldness of the female.

Dawson, in "The Birds of Ohio," states, "I am not aware of a nest's being definitely reported in the state. During the second week in June, birds were feeding full grown young in the ravines opening into the valley of the Hock-hocking, near Sugar Grove." This nest was found about one mile west of South Bloomingville, Hocking County, and is about fifteen miles (as the crow flies) south of Sugar Grove.

This, therefore, is probably the first nest "definitely reported in the state." The environment in this portion of Hocking County is evidently ideal for this species, as the land is cut up into deep ravines and valleys with corresponding steep, brush-overgrown hillsides. I heard several singing males the same day that the nest was discovered, but could not locate another nest.

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Edited by LYNDS JONES.

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Editorial

Before the next issue of the Bulletin finds its way into the mails there will have passed the twenty-fifth anniversary of the founding of the organization out of which our Club grew. On May 30, 1886, there was drawn up by one L. Otley Pinder, a constitution of the Young Ornithologists Association. Whatever of publication was done in the first years of the organization appeared in the pages of the old "Oologist." Then "The Curlew" spread its pinions—and died. Next the "Ornithologists and Oologists Semi-Annual" mothered the infant organization under a changed name. Next the organization essayed two numbers of a quarterly (The Wilson Quarterly), found the burden too heavy, and the following year published two abbreviated numbers of a "Journal." This was neap tide. Thus ended the "Old" order. Accomplishment—five volumes of varying character—a rising and a falling tide. The "New" order was ushered in with three small, largely business, "Bulletins," followed the next year (1895) with

two Bulletins containing reports. Then began a regular series of six issues a year, albeit most of them were small and thin. The opening of the new century saw the number in the year reduced to four, and the size more than doubled. And thus we reach the point of this brief sketch. The last volume was much the best that our organization has accomplished, but the present volume will surpass the last one. There are now ready for the printer three exceptionally fine articles which could not find room in the present number for the June issue, and Mr. Frank L. Burns' monumental work on the Broad-winged Hawk will be printed as the September number. It is waiting for the printer. It will cover some 150 Bulletin pages, and will be well illustrated. This will be Mr. Burns' third "Monograph." It is the most complete life history that has ever been written of any bird.

The present number of the Bulletin has been been held up for want of mailing envelopes. The order was in for three months before it was filled. The manufacturers of mailing envelopes seem to be doing a marvelous business!

The editor's promised report of the summer work done on Pelee Island will have to be put over until a supplementary summer's work is done on Point Pelee under simliar conditions. Already plans are under way for that work, to occupy the latter part of the coming summer.

The Falcones series will be resumed with the June number. It has not been possible to secure all of the materiai necessary to continue the series earlier.

Field Notes

FALCO RUSTICOLUS IN OHIO.

During a visit at the Ohio State University in November, 1910, Prof. James S. Hine showed me a mounted specimen of *Falco rusticolus* in the museum of the University. The bird was shot on January 30, 1907, at Washington C. H., in Ohio. The Professor stated that somewhere there was a published note of this, but it was not in any bird magazine, and I think it worth while to bring this hiden record to light in our Bulletin, where the ornithologists can read it and have ready access to the record.

New Bremen, O. W. F. HENNINGER.

COWBIRD.—Mr. Harry B. McConnell's mention of the appearance of a Cowbird at Cadiz, Ohio, February 23, 1906, in the Bulletin in Vol. XXII, No. 2, pp. 125, recalls a similar incident. On January 8, 1909, a farmer telephoned me that he had shot a black English Sparrow from a flock that was feeding about his hog pen; of course I was anxious to see it, and he sent it to me. It proved to be a male Cowbird in excellent condition. Inquiry elicited the fact that it was the only one in the flock. The date only, is unusual, as I have very frequently seen mixed flocks of English Sparrows and Cowbirds feeding together in the fall. The only places I have seen them thus feeding together, however, has been in the feeding lots where hogs are fed the cobs of sweet corn, that are hauled from the canning factories.

ALBINISTIC ROBIN.—This specimen was brought to me on October 3, 1910, by a man who had shot it from a flock of robins. It is evidently a "bird of the year." The bird is not a complete albino, but is colored as follows: Throat, white with dusky streaks; head and back, pale yellowish; primaries and tail feathers, white with a faint yellowish tinge; upper tail coverts, paler than the back; lower tail coverts, white; breast and sides, pale rufus (much paler than normal); bill and feet, flesh color.

Circleville, Ohio. B. R. BALES, M.D.

A PRIVATE BIRD PRESERVE.

That one of the largest breeding colonies of herons to be found in this country is located on lands belonging to the McIlhenny family at Avery Island, Iberia Parish, Louisina, may be news of much interest to most of our readers.

In a letter to the writer, dated November 3, 1910, and accompanied by many interesting photographs taken in the rookery, illustrating the nesting habits of the birds, Mr. Edwd. A. McIlhenny estimates that more than 15000 pairs of Gulf Coast birds nest annually on the "Island," embracing several species of herons, among them 2000 pairs of the Little White or Snowy Egret (*Egretta candidissima*) which, as many of us are aware, suffered most dsastrously (verging on extermination) at the hands of plume-hunters.

In the opinion of Mr. McIlhenny the Avery Island Preserve is the most extensive one of its kind in the United States.

Such effective bird-protection work is most commendable and encouraging.

Let us hope earnestly that it may be patterned after and introduced successfully in other parts of our country as well.

We need many such places, and, if the national and state gov-

ernments cannot so readily create and perpetrate them, private citizens happily placed, and with the means and inclination to do so, can—taking the results of this Louisiana enterprise as an illustration. B. T. G.

EXCEPTIONAL OHIO RECORDS.

The unusual opening of winter in December and its continuance into the early part of January put the most of Ohio on the winter basis, as far as bird life is concerned, at least two weeks earlier than usual. From a purely local standpoint this condition should result in the influx of some of the more hardy winter birds early and bring into the region birds which pay a visit to the state only once in a number of years. Reports coming from northern Ohio indicate that there was a decided influx of at least two exceptional species.

Bohemian Waxwing (*Bombycilla garrula*). During the greater part of December, all of January, and until February 17, a flock of a half dozen birds lived in two northern spy apple trees, which still contained some frozen fruit, at the writer's home in Birmingham. They left when the robins came and worried them. Their peculiar squeaky twittering note was constantly mingled with the conversation coming from a neighboring hen yard. This visitation seems to be the first recorded one for this county.

Evening Grosbeak (*Hesperiphona vespertina vespertina*). Since the 1890-1 visitation to northern Ohio there seem to be no other records until this winter, just twenty years later. The exact date of first occurrence is lacking, and is of minor importance since for Oberlin a flock of six birds have been present (is still present) since early in December. Mr. H. G. Morse reports one brought to him on January 21st, shot from a flock which was about a mile south of Huron. Mr. Frank T. Cartwright, Jr., writes me that there have been two of these birds in Delaware this winter. Mr. E. A. Doolittle, of Painesville, Ohio, reminds me that the record of this species on March 20, 30, and 31, 1909, which he reported to me at that time, never appeared in the Bulletin, through an oversight of mine. I am glad to correct that omission as far as possible now by calling especial attention to the 1909 occurrence, which seems to be the only one for Ohio for that winter. Mr. Doolittle also reports a single bird at his home on March 13 and 16 of this year.

These records, with reports of another visitation to New England, seem to indicate that conditions north were again such that the birds were forced to find new feeding places. We may proba-

bly safely assume that these southward movements are caused by failure of food in the more northern parts of the bird's winter range, but what seems to be corroborative evidence is usually lacking. Such evidence is given by Miss Althea R. Sherman, who writes that in that part of north-eastern Iowa, near McGregor, the severe weather of last April killed the mountain ash fruit buds so that the grosbeaks find none there this winter. It should be possible to study the conditions which force these northern birds south periodically. Coöperative study should be carried into this field.

LYNDS JONES.

RECORDS FROM THE TRI-RESERVOIR REGION IN OHIO IN 1910.

Besides the interesting records of Otocorys alpestris alpestris and Ampelis garrula given in the March, 1910, number of the Bulletin, the following seem worthy of special mention:

1. February 21st, Bonaparte Gull flying over the canal.

2. March 3 and November 21, each date, one Short-eared Owl.

3. March 5, first Red-winged Blackbirds. Earliest date in region.

4. February 16, Snow Geese seen. Exact status of species not to be recognized.

5. March 12, two male Redheads shot at Loramie Reservoir. First record for this reservoir, while it is common at the Lewiston. The same date brought the Baldpate female shot, also an early date; March 13 bringing in the first Lesser Scaup, March 14 the first Pied-billed Grebe, both earlier than in 1909.

6. A fine male Shoveller shot on April 9, Loramie Reservoir.

7. A fine female Osprey shot on April 25, Loramie Reservoir.

8. A fine female Loon shot on April 21, Loramie Reservoir. The Green-winged Teal appeared March 18, a week earlier than in 1909, the Woodcock March 16, the Blue-winged Teal March 29, the Pectoral Sandpiper March 22, (earliest state record), all very early dates.

9. The Prothonotary Warbler was seen, but not taken May 10 at the Grand Reservoir; the same date the Sanderling showed up, my first and only spring record for this species.

10. The Common Tern was seen May 8, the Black Tern on May 10.

11. May 25 a nest of the King Rail, with eleven eggs, was found in the tall grass of a small pool of water not deeper than twelve inches, perhaps sixty feet square, not more than seventy-five feet away from the public highway.

12. On September 1, a rainy, squally day, thousands of Sandpipers on the Grand Reservoir. On a three and a half mile strip I counted over 900 Semipalmated Sandpipers, something like 300

Least Sandpipers, 200 Semipalmated Plovers, 18 Black Terns, 2 Sanderlings, 1 Pectoral Sandpiper, 7 Golden Plovers, 2 Black-bellied Plovers, many Greater Yellow-legs and Yellow-legs and Wilson's Snipe.

13. On October 25 I shot an immature male of the Red-backed Sandpiper at the Grand Reservoir, my first positive record for this region.

14. On November 15 I shot and saw my last Woodcock for the season, a good late date, and on December 3 a fine female of the Wood Duck was shot at the Loramie Reservoir and brought in to me on December 5. W. F. HENNINGER.

NOTES FROM NORTH-EASTERN ILLINOIS.

The fall of 1910 seems to have been exceptional in bringing to us the Evening Grosbeak at an unusual date. Other species of interest recorded were the Red Crossbill, seen here November 12, though unquestionably heard as early as October 10, and the Siskin, which was reported from Addison, this county, by Professor Eifrig.

Here the Siskin's movements appear to be very erratic. Evening Grosbeaks were noted at Lincoln and Jackson Parks, Chicago, during the latter half of October, and reported from Lake Forest more than ordinarily plentiful. A solitary female was observed at Glen Ellyn by the writer November 2, the first appearance of the species here to my knowledge since December, 1889, during which season it was seen at several places in this corner of the state. This bird did not tarry long, as was to be expected in the shortage of its accustomed food, the persistent fruit of the box-elder, which the past spring was entirely killed in the blossom by the April freeze-up. This fact may account for the early arrival of Grosbeaks this fall, as the abnormal weather of that period covered a wide area. It will doubtless be shown, too, that the birds have gone much farther south this year than usual on that account.

that account.

In a letter to the writer, dated January 22, 1911, Miss Elizabeth Eldridge, of Plainfield, contributes some interesting facts relating to the present status of the Prairie Hen in this part of the state. She writes that during a walk last November sixty of them were counted in a pasture near their home, and since then others, as many as twenty at one time, have come about the place.

Last season a brood of nine was hatched from a nest in the roadway not far from their house. Such reports are encouraging compared with one received last fall from St. Charles on the Fox

River west of here. It was through my friend, Ruthven Deane, of Chicago, and to the effect that one farmer near there was poisoning the Prairie Hens, as a result of the damage they were doing to his crops. What a mind and what reasoning! This of course is an isolated case. Otherwise it would offer a splendid opportunity for effective institute work.

Miss Eldridge mentions the Flickers as wintering in her locality this season.

It is interesting to note that our first spring arrival here this year was the Flicker, two being seen February 26. To-day, March 3, Robins are in evidence, and in song.

December 8 was made memorable by the presence of the Pine Grosbeak on our place. With us, a rare late fall and early winter visitant, my records are few. There were two on this occasion, one a rich red male, the other in female dress. The writer discovered them together at 1 p. m. feeding upon the persistent fruit of the snowberry, *S. racemosus*. It was an interesting sight; the birds, and the clusters of partly withered fruit; the snow-covered ground, and bright sunlight, making in all a combination of rare merit.

Glen Ellyn, Ill. BENJ. T. GAULT.

Personals

OUR MEMBERS HERE AND THERE.

Mr. W. M. Dutcher, we understand, is critically ill at his home in Plainfield, N. J. We hope he will be spared to continue his great work for the protection of birds.

Lately we read in a newspaper that the father of Dr. Jon. Dwight, Jr., died at the ripe old age of eighty years. We extend our heartfelt sympathy to the Doctor in his bereavement.

W. Lee Chambers has moved from Santa Monica to Los Angeles.

Bradshaw H. Swales spent the beginning of the new year in the East.

Dr. Louis B. Bishop has been spending the winter in northern Africa, at Biskra, Algiers, studying the birds and mammals of the northern Sahara. Decidedly "dry" territory!

Prof. Wilfred Osgood, our new member, is in Venezuela collecting for the Columbia Field Museum of Chicago.

We welcome Dr. Howard E. Jones, of Circleville, Ohio, one of the famous "old timers" of Ohio in Ornithology, in our midst.

Mr. John Lewis Childs of Floral Park, N. Y., has sent us the

last copy of the "Warbler," containing a catalog of the mounted birds, nests, and eggs of his great museum. It appears to be thoroughly scientific, well equipped, and evidently second to none.

J. Parker Norris, Jr., of Philadelphia, Pa.; Troup D. Perry, of Savannah, Ga.; Gerard Alan Abbott, of Chicago, Ill., all well known Oölogists, have recently joined our ranks. The Wilson Club is glad to get good Oölogists any time.

Isaac E. Hess, of Philo, Ill., is spending February in the Everglades region of Florida on business. He will keep a sharp lookout for the birds.

Prof. James S. Hine, an entomologist of international repute, and Prof. W. C. Mills, an able Librarian and great archæologist, both from the Ohio State University, and both good ornithologists too, have come into the fold, the first men of that institution to be with us. We hope others will follow!

Prof. Zeno P. Metcalf, of Raleigh, N. C., spent part of his six weeks' vacation last fall at the O. S. U. in Columbus, Ohio, where we had the pleasure of making his personal acquaintance.

Prof. G. Clyde Fisher, of Funiak Springs, Fla., is spending a year at the Johns Hopkins University, Baltimore, Md.

Mr. Norman A. Wood reports quite a good many interesting bird notes from his trip to the Shively Islands last fall, but he says there were no mammals at all!

We understand that our member, A. C. Bent, of Taunton, Mass., is to fill the position of the late Maj. Chas. E. Bendire and Dr. W. L. Ralph, as Oölogical Curator at the U. S. Nat. Mus. We think the selection is a good one and that he is splendidly fitted for the position. Wilson Club men are rapidly coming to the front!

Rev. P. B. Peabody was quite successful in his search for the nest and eggs of the Yellow Rail in North Dakota last summer, and also in the finding of Henslow's Sparrows eggs at his home in Kansas.

Mr. Frank M. Chapman, the distinguished eidtor of Bird-Lore, and Assistant Curator of the Am. Mus. of Nat. Hist. in New York City, etc., etc., has joined the Wilson Club. We hope the learned author will prove a great help to our Club and Bulletin!

Louis Agassiz Fuertes, the famous artist, and Dr. Wells W. Cook, of the Biol. Survey, the great record keeper of bird migration in the U. S., have become members of our Club, which is adding many new celebrities to its ranks.

Statement

Through a correspondence with Prof. R. Ridgway we have found out that he did not receive many copies of the Wilson Bulletin in the past, through no fault of the editor, however, to whom no blame is attached. Hence, of course, it was impossible for him to quote the Wilson Bulletin in his work on "The Birds of Middle and North America," for you cannot quote from a magazine that you have not received. Under these circumstances the statement that Prof. R. Ridgeway "persistently ignored" the Bulletin, as stated in the December, 1910 issue, is incorrect and is hereby retracted.

W. F. H.

Publications Reviewed

Catalogue of Canadian Birds, by John Macoun and James M. Macoun. Ottawa, 1900.

The Catalogue proper covers 761 pages exclusive of 26 pages of prefatory matter and index. It is avowedly a compilation, and as such shows a great amount of painstaking labor. Since the authors are primarily botonists rather than ornithologists, one could hardly expect to find in such a compilation anything more than a faithful reproduction, in abridged form for the most part, of published writings relating to Canadian birds. We miss some of the later publications on the region, notably the Point Pelee list by Taverner and Swales, which appeared in this magazine. Nor do we find evidence of discrimination in citing records. Rather, the reader is left to use his own knowledge and discrimination in accepting the cited records. We heartily commend the modest position taken by the authors in disclaimnig perfection for their work, and earnestly calling for corrections and additional known in order that we may have a better basis for knowing the reasons for the invasions of the United States by species whose normal winter range lies within Canada. L. J.

Birds and Mammals of the 1909 Alexander Alaska Expedition.—Harry S. Swirth.

This Bulletin has noticed briefly the work of Harry S. Swarth among the lower coast island of Alaska, during the year 1909, the published results of which expedition have lately appeared, bearing the Berkeley Press date of January 12, 1911.

It is in bulletin form, constituting No. 2 of Vol. 7 of the zoological publications of the University of California.

This expedition was organized and financed during that year by

Miss Annie M. Alexander, the report comprising a well printed document of 163 pages, including plates and maps. Eighteen pages are devoted to the introduction and descriptions of localities visited; 86 pages to a check-list and notes on the birds of that region, the remainder, for the most part consisting, of a report on the mammals seen and collected.

We will not dwell at length upon the material results of the expedition further than to say that, of the 137 species and subspecies of birds listed, specimens of 106 are represented in the collection.

Several localities visited were practically destitute of results, and animal life, generally speaking, was plentiful at comparatively few places. The work among these islands was hampered considerably by the lack of suitable camping sites, many times the almost impenetrable character of the country and bad weather conditions.

With the birds much space has been given to their distribution, relative abundance, conditions of moult and feather-coloration.

We would like to have seen a greater number of breeding records and notes pertaining thereto, but conditions confronting the author doubtless were responsible for their crowding out, or the impossibility to secure. The grouse have received considerable attention, and some pertinent suggestions are made as to the possibility of recognizing a new race of the Sharp-shinned Hawk from that region, though in this case, as with other supposed subspecies, speculations are entered into cautiously. Among the common birds of that region were the Alaska Bald Eagle, Northern Raven and the coast form of the Northwestern Crow. With the exception of the Harris, woodpeckers were uncommonly scarce. The distribution of the Song Sparrows proved an interesting study, as also the movements of the warblers.

The shyness of the smaller Thrushes and Robins was puzzling to account for.

An unlooked for and interesting sight was the number of Black Swifts met with at two places.

Several species of birds listed are considered new to the Alaskan fauna, among which may be mentioned the preceding, also the Vaux Swift, Cedar Waxwing and Mountain Bluebird. The Blackpoll Warbler is remarked on as a straggler from the interior.

The mammal portion of the report is important, covering as it does the larger part of the scientific results of the expedition, but it is outside the province of this magazine.

Methodically, technically and typographically this publication ranks high; it clearly displays the zeal of its author and should be regarded as representative of the excellent work being produced

by the Berkeley institution, of which the following is a list of its most recent publications pertaining to the study of birds, viz:—

Birds of the University Campus, by Joseph Grinnell. Significance of White Markings in Birds of the order Passeriformes, by Henry Chester Tracy. An Apparent Hybrid in the Genus Dendroica, by Walter P. Taylor. The Modesto Song Sparrow, by Joseph Grinnell. The Linnet of the Hawaiian Islands: A Problem in Speciation, by Joseph Grinnell. B. T. G.

Election of Officers

In the recent Club election fifty-eight ballots were cast, resulting in the following choice of officers for 1911, viz.:

For President—Frank L. Burns.

For Vice-President—William E. Saunders.

For Secretary—Benj. T. Gault.

For Treasurer—Walther F. Henninger.

For Executive Council—Lynds Jones, Harry C. Oberholser, ~~James H. Fleming.~~ B. H. Swales

C. W. G. EIFRIG,

p. 126 Judge of Election.

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ELECTION OF MEMBERS.

The following nominations for membership in the Wilson Club have been approved by the Executive Committee. Members will therefore confer a favor in notifying the Secretary at once if objections to any of these are offered. In the absence of objections, candidates are considered duly elected, according to our Constitution:

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Mills, Prof. W. C., O. S. U., Columbus, Ohio.
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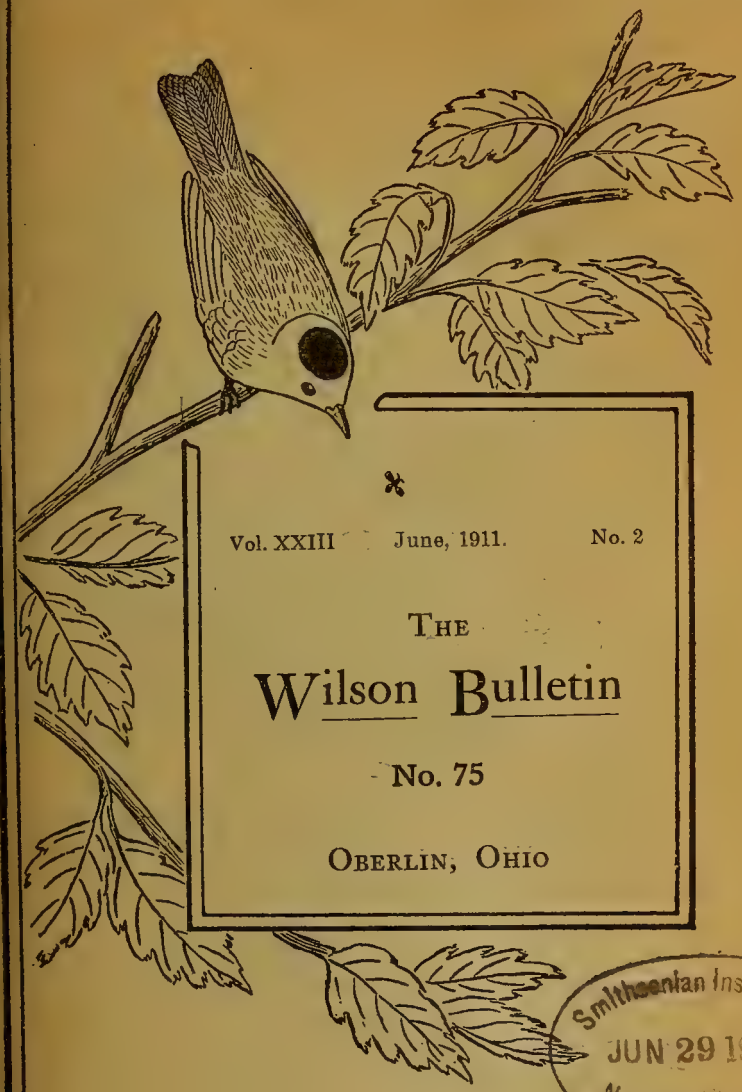

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No. 75

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WILSON ORNITHOLOGICAL CLUB

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All articles and communications intended for publication, and all publications and books for review, should be addressed to Lynds Jones, Oberlin, Ohio.

Articles of general interest relating to bird life are solicited. They should be in the hands of the editor not later than the fifteenth of the month preceding publication.

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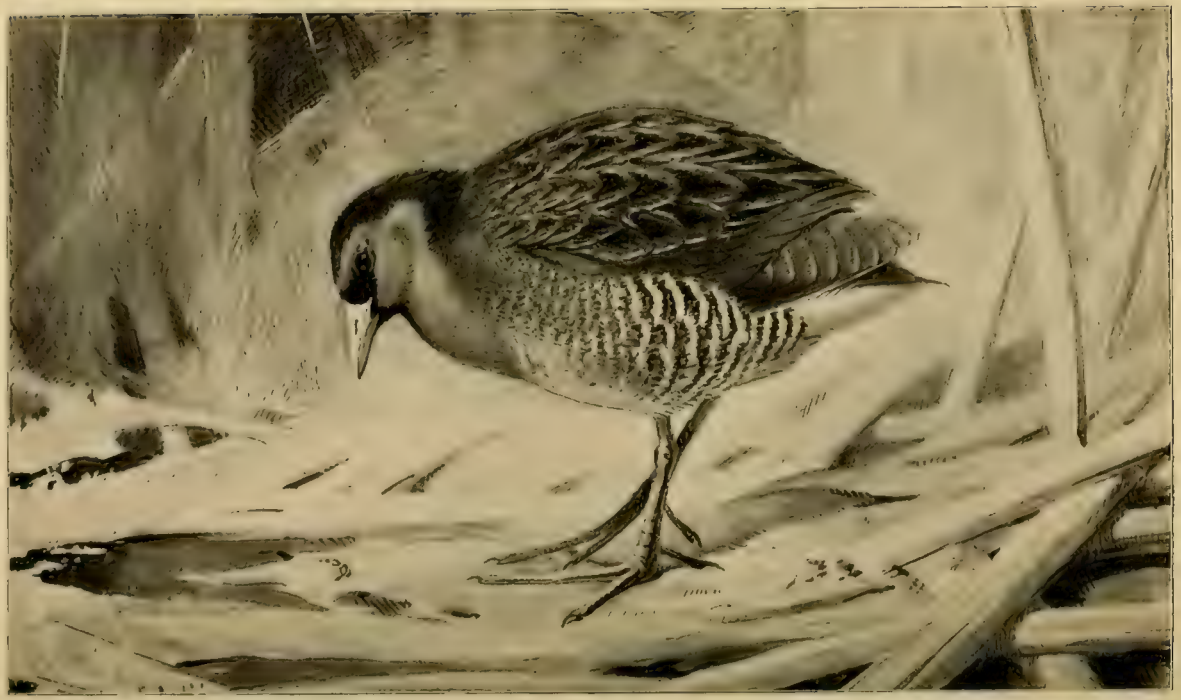

SORA RAIL (*Porzana Carolina*) after sketches from life. R. J. S. Jan. 1911.

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NOTES ON CAPTIVE PALUDICOLAE.

BY ROBERT J. SIM.

To a naturalist whose home is far from any extensive marshes the opportunity to study rail-birds seldom comes. Even a month's stay in the neighborhood of acres and miles of swamps may result in only a few glimpses of the birds in question. And in such cases the rails are usually on the alert. They seem to fancy that danger lurks in every movement the observer may make. Now imagine trying to study intimately the ways of a human being if that person continually labored under the impression that his observer was bent on killing!

On April 29, 1907, an adult Sora Rail was brought to me. It was alive and in good condition except that one wing was a little stiff. Here was a chance to become acquainted with a rail and prove to him that there were no evil intentions or blunderbusses concealed about my person. He was liberated in a large room and provided with a dripping-pan of water, some mud, and, just for the sake of old times, a bunch of cat-tails. We spent many hours together studying each other. The world will never know what has been lost through the rail's inability to keep notes.

For several hours he skulked in dark corners and always succeeded in keeping some object between himself and the

human. But with increasing appetite and growing curiosity he became bolder. An earthworm was tossed to the floor a few feet away. The rail walked slowly out, picked up the worm, then dashed back to cover. After all this was repeated a few times with no ill results he stepped out more promptly and retired more slowly. From then on our familiarity grew. I have had several species (alive) of nearly every order represented in Ohio, and have yet to see the bird that will not resume its usual actions after it has once become accustomed to the presence of man.

A rail which is quite at ease is very different in appearance from one that is frightened or at all nervous. Most birds of this kind to be seen in taxidermial collections look as if they had been "scared stiff"—a state of things which is, perhaps, consistent enough. But a live, comfortable rail going about his own business is as graceful a bird as you could find, and plump like a guinea-hen or a Hubbard squash. The tail is carried in a horizontal position or droops slightly. On the other hand, when filled with apprehension the bird is very slim, the head is lowered and extended, and the tail is cocked up or is twitched up at every step. All the above in this paragraph applies as well to the Virginia Rail, the Coot and the Florida Gallinule. (The Sora shown in my drawing is in the act of pausing to inspect something on the ground before him).

As you know, all rails have long toes which enable them to keep up where the walking is soft. Without being in the least awkward about it my bird often stepped on his own toes, and nearly always stood with the inner pair crossed. When walking his movements were quick and noiseless even on the bare floor. I could never touch the bird, but his shyness was exceeded by his curiosity; and whenever I sat still for a little while he would walk round and round my chair, finally jumping up to my foot, knee, shoulder, and head, pecking at every thing on his way up. All drawing and writing had to be done slowly; for any quick movements would scare my subject away.

A Carolina Rail, it will be remembered, is scarcely more than eight inches in length. But when running it can set an astonishing pace, leaving tracks a foot apart! At such times the feathers are pressed close and the body is tilted up astern.

While in captivity my bird fed upon small beetles and earth-worms. One or two large "night-walkers" sufficed for a meal, but if the worms were smallish eight or ten were not too many. Considerable water was used inside and out. After a bath the wings were held in a roof-like position — like the wings of a Noctuid moth. In similar circumstances coots and gallinules expose their primaries to the sunlight in the same way.

At night the Sora roosted in some dark corner on the floor. He stood up on both feet with his head turned around and tucked under the humeral feathers from above.

A druggist in Jefferson once kept a live Coot in the store-window for some time. A corn-field was reproduced, for effect, in miniature. This bird ate all the insides out of a jack-o-lantern, reaching in thru the eyes and nose to do it, but instead of "shinning up a corn-stalk" to roost—as the owner declared—the coot spent his nights on the floor. His attitude in sleep was like that of the rail—excepting that he stood on one foot only. The other was quite concealed.

To me the marsh-birds have always had something of mystery about them. They seem to have been handed down to us from an earlier epoch and undergone little change. The robins, wrens, and other familiar birds quite likely looked on with approval when our hairy, low-browed ancestors gave up their arboreal habits and took to the ground; but the rails and mud-hens, or birds not far different, must have skulked in the shadows of huge amphibious animals in times when there were no men. There is something peculiar in the quizzical, half sinister glance of a rail-bird. One feels that this little dark eye had vague memories of sights which would make a man's blood run cold. It is at once alluring and forbidding. We are never taken fully into the confidence of a

marsh bird. Compare the look of a Rail with the honest, open regard of a robin.....All this, as you will say, is quite subjective and unscientific: but I leave it to you — *isn't* there something uncanny about a rail-bird?

THE RESULTS OF THE MERSHON EXPEDITION TO THE CHARITY ISLANDS, LAKE HURON.

BIRDS.

BY N. A. WOOD.

INTRODUCTION.

As may be inferred from the title, this paper is one of a series that is to appear on the fauna and flora of the Charity Islands, as the result of investigations carried on by different members of the Mershon Expedition of the University of Michigan Museum. A brief account of this expedition * by Dr. Ruthven has already appeared. It will be sufficient to say here that the work was made possible through the generosity of Hon. W. B. Mershon, of Saginaw, Michigan, and that it was carried on under the direction of Dr. Ruthven during the summer of 1910 by six men, each of whom gave primary attention to a particular group. The writer was given charge of the vertebrate work, and, the mammals, reptiles and amphibians being few in number, was able to devote nearly the entire time to a study of the birds. He arrived at the Charity Islands on August 16 and remained there until October 11. During a part of the time he was assisted by Mr. Frederick Gaige, who was on the island from September 7–28, and considerable assistance both in the way of specimens and data was received from the light-house keeper, Captain Charles C. McDonald, and his assistant, Mr. Joseph Singleton. Captain McDonald's assistance was particularly valuable as he had resided upon the island for

* Science, N. S., xxxiii, pp. 208-209.

LAKE HURON

POINT LOOKOUT

CHARITY ISLAND

LITTLE CHARITY ISLAND

CASEVILLE

SAND POINT

SAGINAW BAY

MAP
OF
SAGINAW BAY
DRAWN FROM LAKE HURON
COAST CHART NO. 2,
U.S. LAKE SURVEY
SCALE = 4 MILES TO 1 INCH

H. Thompson Del.

twenty-nine years, and was familiar with a considerable number of species.

Charity Island, the largest of the islands in the group, is situated in the mouth of Saginaw Bay just above the parallel of 44° north latitude. It is owned by the United States Government and is used as a light-house station. The light is of the fourth order and stationary. The island comprises about 650 acres of sand and rock, and is covered with a natural forest of oak, maple and scattering Norway and white pine. A shallow pond of several acres lies near the west beach, and in the low land east of it is a fine growth of white birch. This pond is bordered on the north and west sides by a cranberry marsh which is now quite narrow although formerly quite extensive. The foundation of the island is the Maxwell sandstone which out-crops as ledges on the north and east sides of the island but which also appears on the other sides, especially on the five points, which are bare rock. Between these rocky points there are sand beaches of more or less extent, and, back of these, old beaches or low sand dunes of nearly uniform height cover nearly all of the island.

Most of the ridges are thickly wooded, but south of the center is an open area with a few scattered red oak trees, and on the west side there is a high dune covered with tall beach grass and scattered juniper bushes. The island is about seven miles east of Point Lookout on the west side of Saginaw Bay, and about nine and one-half and seven and three-fourths miles northwest of Caseville and Sand Point in Huron County.

Most of the work was done on Charity Island proper, and the observations recorded in this paper apply to that island unless otherwise stated.

The resident birds are few in number, but our list of breeding birds cannot be considered complete, for when work was begun (August 16) the nesting time for most of the birds was past.* The species that with little doubt bred on the island this summer were:

* The Michigan Geological and Biological Survey plans to carry on biological investigations on the islands early in the summer of 1911, and the resident ornis will then be investigated in detail.

Merganser.
Woodcock?
Spotted Sandpiper.
Bald Eagle.
Yellow-billed Cuckoo.
Black-billed Cuckoo.
Belted Kingfisher?
Northern Hairy Woodpecker.
Downy Woodpecker.
Northern Flicker.
Chimney Swift.
Kingbird.
Crested Flycatcher.
Least Flycatcher.
Wood Pewee.
Crow.
Purple Finch.
Blue Jay.
Goldfinch?
Field Sparrow.
Song Sparrow.
Swamp Sparrow?
Barn Swallow.
Cedar Waxwing.
Red-eyed Vireo.
Warbling Vireo.
Yellow Warbler.
Redstart.
Catbird.
White-breasted Nuthatch.
Chickadee.
Robin.
Common Tern
Black Duck?
Herring Gull?
Piping Plover, in other years but not in 1910 (see p. 92).

The absence of many of the species that occur commonly on the mainland is easily accounted for. As the island is small, there are only a few habitats, and these are mostly of very limited extent. Then again many plants and many species of animals other than birds are absent from the island. For instance, on the mainland one of the most common trees in the sand region about the bay is the jack pine but this species is represented on the island by only one small tree, and it is doubtless owing to this that, although on Sand Point, less than eight miles away, we found the pine warbler a common and breeding species in 1908, and it is known to breed commonly in the counties just across the bay to the west, the species was not seen on the islands even during migration. Its absence can be accounted for by the absence of the jack pine, which seems to be its favorite tree for both nesting and feeding. The absence of the scarlet tanager and Baltimore oriole cannot be explained in this way, but many other species of birds, as the meadowlark, bobolink, rails and bitterns, do not find suitable habitats on the islands, and

the hawks and owls cannot find suitable food there, as mice and other small mammals are absent.

Notes on the Fall Migration.

It is no doubt largely owing to their situation that the islands are used as a stopping and feeding place by the birds on their migrations. As it is, thousands of individuals alight here on the spring and fall migrations.

Nearly all of the waders came to the island during the day time. Most of the flocks were seen just at daylight or sunset, coming from the direction of the mainland, but others arrived at other times during the day. Several hawks, including the duck hawk, pigeon hawk, sparrow hawk, and sharp-shinned hawks, were also seen as they came to the island from across the bay, generally early in the morning or in the forenoon. On September 10, about 11 A. M., eight black-bellied plover and six golden plover came to Light-House Point, and small flocks of the former were seen coming from the west all day.

The winter species invariably came just before or during a cold north wind, and the American pipits, horned larks and Lapland longspurs came during the daytime. In Michigan we have very few records of the horned lark (*Otocoris alpestris alpestris*). Our resident form is *O. a. praticola,* a prairie form that has entered the state from the south and west, probably since it became settled. The first record for the horned lark was on September 18, for the pipit September 19, and for the longspur September 30. This was before the last great migration wave of warblers, which occurred October 5–6. The theory that the northern species are driven south by severe storms or a scarcity of food in their summer home is hardly in harmony with these facts. The snowflake was found on the beach at Caseville on October 12, and the northern shrike was found on the island October 7.

The species that migrate at night were studied by observing them as they passed the light, and by making a careful daily census of the bird life of the island. While it is a well

known fact that light-houses are quite destructive to birds on their migrations, it is not so well known that only a very small percentage of the birds that pass such lights ever strike them, while the number that are killed is even smaller. My observations confirm those of other observers in that the birds seemed to strike the light only under certain conditions. During my eight weeks stay on the island I found dead birds on but two occasions, although I saw birds fly around and past the light in great numbers nearly every night. As a rule, the weather was fine and the nights clear with the wind generally north or south, and birds do not generally strike the light under these conditions.

One of the most notable bird waves occurred on the night of September 4, when I noticed numbers of small birds flying past the light soon after it was lighted (which was always at sundown). The night was cool and cloudy and there was a light north wind. The birds came from due west and continued to increase in numbers until midnight, when a severe thunder storm came up from the northeast accompanied by strong wind and driving rain. This with the darkness seemed to confuse the birds, which came to the light in great numbers. From the west side of the platform which surrounds the light, I watched the migration until the storm was over, and at daylight the birds stopped flying. The wind and the rain did not seem to stop the migration and dozens of birds were in sight all of the time. Most of them came from the southwest and flew directly against the wind, which no doubt had forced them to the south of their line of flight while over the water. Most of them flew very slowly, and as they entered my vision they looked like drifting leaves, and, as they neared the light they went over, below, and all around it. A few fluttered against the glass and I caught several in my hands. A very few struck the glass with a dull thud, which I could hear even when on the other side of the light. Some of them fell dead on the platform, others bounded off to the ground. The majority of the birds that struck were only stunned and

soon fluttered into the darkness. At two o'clock the storm was at its height and the birds seemed to be as plentiful as at any time during the night, but were more confused and kept up a continual loud chirping, particularly the thrushes and vireos. These calls seemed to be of alarm, for on other nights they were more subdued. In the morning after the storm the whole island, but particularly the clearings and the willow bushes, was alive with birds. On the ground about the light I picked up twenty dead ones of seven species as follows: six olive-backed thrushes, seven bay-breasted warblers, one black-poll warbler, one magnolia warbler, one mourning warbler, one blackburnian warbler, and three red-eyed vireos.

Another large migration wave occurred on the night of September 6, but the night was clear and no birds struck the light, although many were seen flying past it. The wind was light and from the southwest. On the night of October 5 occurred the last and largest migration of birds that I saw on the island. October 5 was warm, clear and still, and the wind was southwest until about midnight, when it changed to the north and by morning was blowing a gale. It also became very cold. No birds were seen until after the wind had changed, when they commenced to fly and by early daylight were coming from the southwest across the bay. Under the light I picked up a dead male and female black-throated blue warbler, a redstart, one myrtle warbler, and one palm warbler. Thousands of these species with some black-throated green warblers, vesper sparrows and flocks of juncos also came. The migration continued long after daylight, and the birds flew low, many of them lighting on the roof, window ledges and steps of the light-house and on the ground in the clearing, especially under the shelter of the willow and other low bushes. The bulk of the migrants were myrtle and palm warblers, although there were many of the other species mentioned.

Captain McDonald told me that during the spring migration of 1910, he picked up one hundred and seventy-four dead birds in one morning under the light. These were mostly

small birds, many of them no doubt warblers, as he said they were brightly colored, and it was in May. He said that the birds never struck the light unless it was misty or foggy and very dark. Dixon * says, "It has been universally remarked by light-keepers that birds strike most frequently on dark cloudy nights, with fog, haze or rain. Instances of birds striking on clear nights are excessively rare." Writing of the large number of migrants taken on Heligoland, Gatke † says, "A necessary condition for this capture is a dark uniformly overcast sky, especially if there be at the same time a very fine precipitation of moisture." This almost exactly describes the conditions that occurred at the time the birds struck the Charity Island Light. Captain McDonald also told me that as a rule many more birds were killed during the spring migration, when the birds seemed to migrate more during cloudy and showery weather. Cooke ‡ says "Fully 60 per cent of the spring migration of 1884 took place in cloudy weather. It is probable, though I am not aware that it has yet been proved, that in the fall migration the reverse is the case, and the larger movement takes place in clear weather." This was certainly the condition of the fall migration of 1910 on Charity Island, only three of the twelve distinct bird waves occurring on dark or cloudy nights. It is to this fact that is due the lesser mortality of birds about this light in the fall.

The following localities are mentioned in the list of species:

Charity Island — the easternmost and largest island in the group.

Light-House Point — the northernmost point on Charity Island, on which the Light-house is situated.

East Point — the most eastern point.

Rattlesnake Point — the point lying between Light-House Point and South Point, on the west side of the island.

* The Migration of Birds, p. 269.

† "Heligoland as an Ornithological Observatory," p. 57.

‡ "Bird Migration in the Mississippi Valley." U. S. Dept. Agri., Econ. Ornith., Bull. 2, p. 17.

Little Charity Island — the westernmost island in the group, lying southwest of Charity Island.

Gull Island — a small islet a little west of south and about one-half of a mile from South Point.

LIST OF SPECIES.

1. (3) *Colymbus auritus.* HORNED GREBE.—This species was first seen near the east end of Little Charity Island on September 25, when one was noted feeding in company with a pied-billed grebe. On September 27, nine were seen diving and feeding near the end of Light-House Point. These birds were all in juvenile and winter plumage.

2. (6) *Podilymbus podiceps.* PIED-BILLED GREBE.—This grebe was first seen in company with a horned grebe near the end of Little Charity Island, September 25, and was next seen near the end of South Point of Charity Island, September 30. At Sand Point, three were seen on August 24, 1908. At Sand Point and on the Charities the fishermen said that the "hell divers were common in spring and later in the fall."

3. (7) *Gavia immer.* LOON.—On August 25 an immature bird of this species was seen near the south point of Charity Island, and another was seen near the island on October 4. The fishermen told me that numbers of them occur on the Bay every spring, and that they are very troublesome, as they light in the pounds and chase the fish around, causing the death of many and filling the meshes of the net with them. The loons are unable to get out of these pounds, and the fishermen kill numbers of them, sometimes tying five or six together and then setting them adrift on the water.

4. (51) *Larus argentatus.* HERRING GULL.—This was one of the very few species seen every day and was abundant when we arrived at the island on August 16. A small sandy island with a long rocky point (Gull Island) about a half mile south of Charity Island, was used as a headquarters for a flock of about two hundred, many of which were immature. Some of these birds were always flying about Charity Island, and I saw them drop down and pick up floating fish in their bills. After the fishermen set their nets (about September 10) these birds always followed the boats and were on hand to catch the small and injured fish that were rejected when the nets were lifted. These they picked up while on the wing, turned them head first and swallowed them. Fish of a pound or more in weight were taken. After the fish had been eaten, the birds sat in flocks on the water or on the fish stakes that held the nets and were often seen perched on the rocks of Gull

Island. The species formerly nested in small numbers on Gull Island and no doubt on the Charity Islands, and some may be seen here at nearly all seasons of the year.

5. (54) *Larus delawarensis.* RING-BILLED GULL.—This species was not noticed about the island, but it no doubt visits them on the annual migrations up and down the lake, as numbers were seen by the writer at Sand Point in 1908.

6. (60) *Larus philadelphia.* BONAPARTE'S GULL.—On August 25, five birds of this species were seen flying near the east beach, and on August 27 and 28 nine were seen on the same beach. On October 12, the writer made a trip to Oak Point, where he saw a flock of about two hundred feeding along the beach. The fishermen call this species the "little herring gull" and told me that they occur in flocks of thousands later in the fall, when the herring are being taken in the nets.

7. (70) *Sterna hirundo.* COMMON TERN.—This is another species that was seen every day. Two or three hundred made their headquarters on Gull Island, and most of these bred there. The fishermen said that the island was covered with the nests and eggs every spring. Some of the young were still being fed when I arrived on August 16. On Charity Island, I saw old birds feeding young that were able to fly but not to catch fish for themselves.

Individuals were often seen to drop into the water and catch and eat small fish. On several occasions birds with small fish crosswise in their bills flew across Charity Island on their way to Gull Island. At other times dozens were seen dipping down to the water of the bay to pick up the flying ants that were strewn over the surface.

Captain McDonald said that in June and July the ants fly all over the bay and are sometimes seen in "windrows" on the beach like the May flies. The assistant keeper, Mr. Joseph Singleton, said that during the summer these ants were found in large numbers on the stakes and the parts of the nets that were out of the water, and were a nuisance to the fishermen who had to handle the nets. He said that these were large black ants, mostly with, but some without, wings. These no doubt form a large proportion of the tern's food at this time of year, for as late as August I saw them continually dipping down to the surface, and the stomachs of several taken on September 15 were packed with ants. One was opened and was found to contain 144 ants. This same species of ant was found under stones at the water's edge on Charity Island.

8. (120) *Phalacrocorax auritus auritus.* DOUBLE CRESTED CORMORANT.—The only bird of this species seen was flying across

Light-House Point on the evening of October 10. It is, however, occasionally seen in the fall about the island. Mr. McDonald has tried several times to shoot one, and one was obtained by Mr. Singleton near North Island (about ten miles south of Charity Island) on November 25, 1909. This bird was sent to Detroit to be mounted, and is now the property of Mr. John Bell of Pontiac, Michigan.

9. (129) *Mergus americanus.* MERGANSER.—This species was first seen on August 17, and after this date flocks of eight to twenty were seen nearly every day, feeding and swimming about the shores of the island. These birds were still in the down and were unable to fly until about September 15, although they made rapid progress over the water by the combined use of their feet and wings. In feeding they swam along the edge of the rocky beach and seemed to scoop up the small fish and crawfish which formed their principal food. The only adult male seen was during a short visit to the island on June 3, when a pair was seen flying along the shore near the light-house. Several broods were raised on the island.

10. (130) *Mergus serrator.* RED-BREASTED MERGANSER.—None of this species were seen, but it is included on the authority of the light-house keeper, who said that in spring and late fall it is common about the island.

11. (131) *Lophodytes cucullatus.* HOODED MERGANSER.—This species was not seen, but it is common in fall and spring, according to the keepers of the light, who have often shot them at the island in the fall. It was said to have formerly bred on Charity Island, which is possible, as the species has been found breeding about the shores of Saginaw Bay.

12. (132) *Anas platyrhynchos.* MALLARD.— The mallard was not seen during my stay on the island, but Mr. Singleton shot three on the pond in October, 1909. Small flocks occasionally stop here to rest and feed, both in spring and fall, and the species breeds at Sand Point, only eight miles south of the island. In a letter Captain McDonald says that late in October, 1910, one of this species was shot on the island pond.

13. (133) *Anas rubripes.* BLACK DUCK.—This species did not breed on the island, but a flock of nine was seen several times about Gull Island. These may have bred there as they could not fly when first observed. On September 17, three black ducks flew quite close to Light-House Point, and on October 2, a larger flock was seen flying near the island.

14. (139) *Nettion carolinense.* GREEN-WINGED TEAL.—This species was not seen by the writer, but was taken at the island in

October and November, 1909, by Mr. Joseph Singleton.

15. (140) *Querquedula discors.* BLUE-WINGED TEAL.—This teal has, according to the keepers, also been taken at the island, both in spring and fall, but was not seen by us.

16. (143) *Dafila acuta.* PINTAIL.—The pintail was reported as not uncommon about the island, in spring and late fall.

17. (144) *Aix sponsa.* WOOD DUCK.—This species was said to have once bred on the island, and has been seen by the keepers in the spring and fall.

18. (146) *Marila americana.* REDHEAD.—The redhead occurs about the island in spring and fall, and has often been seen and occasionally shot by the light-house keepers.

19. (147) *Marila valisineria.* CANVAS-BACK.—This species occurs with the redhead in migration, and is sometimes taken by the keepers.

20. (148) *Marila marila.* SCAUP DUCK.—Mr. Singleton informed me that the blue-bill is common about the island during migrations. He shot an adult female on November 10, 1910, and sent it to the Museum.

21. (149) *Marila affinis.* LESSER SCAUP DUCK.—This species is no doubt more common than the preceding, and probably composes the bulk of the blue-bills seen here.

22. (151) *Clangula clangula americana.* GOLDEN-EYE.—The first record for this duck was obtained by the writer on October 4, when an adult male was noticed feeding off the end of Light-House Point. The species was seen again at the same place on October 9. The keepers said that it was very abundant in November and December all about the island, and that they shot more of this species than of any other. Mr. Singleton sent to the Museum two adult females that were taken at the island on November 12, 1910.

23. (153) *Charitonetta albeola.* BUFFLE-HEAD.—This duck was not seen by the writer, but Mr. McDonald said that it occurred on the pond both in spring and fall.

24. (154) *Harelda hyemalis.* OLD-SQUAW.—The old-squaw is a very common species about the island in fall, winter and spring. The first ones were seen by the writer on October 11, but the fishermen said that they made their appearance about their nets on September 25 of this year. They call the species "Cow-een" and "squealing duck."

25. (172) *Branta canadensis canadensis.* CANADA GOOSE.—Not seen by us but said to be abundant during migrations both in spring and fall. Mr. McDonald said that several were once killed as they were crossing over the island.

26. (190) *Botaurus lentiginosus.* Bittern.—This species was first seen on August 17. It may have bred on the island, although only one or two were observed. They were generally found about the shore of the pond, but one was seen on South Point and one on Rattlesnake Point. The last one seen was on September 15, near the pond.

27. (194) *Ardea herodias herodias.* Great Blue Heron.—This species did not breed on the island, and it was usually seen only as it flew across from the west side of the Bay. It was first noted on August 21, when the writer saw one come from the west and fly across the island to the east; and others were seen on September 1, 5, and 25. The only place where it was seen to alight was in the pond, where it was observed on two occasions.

28. (212) *Rallus virginianus.* Virginia Rail.—This rail was a rare migrant on the island, being seen only twice—on September 2, in tall rushes at the edge of Rattlesnake Point, and on September 11.

29. (214) *Porzana carolina.* Sora.—The sora was more common than the preceding, and was first seen on August 27 at the edge of the pond. Two others were flushed from this place. It was also seen in the rushes at the edge of Rattlesnake Point, where the last one was seen on September 27.

30. (228) *Philohela minor.* Woodcock.—This species may have bred here, for on August 17 the writer saw where they had been feeding, and later (October 8) a very large female was taken near an old garden. This bird had not finished moulting. One or two smaller birds were also seen at different times at the same place, but there seemed to be no migration to or across the island.

31. (230) *Gallinago delicata.* Wilson's Snipe.—This snipe was first seen on August 24, on the mud flats about the pond. After this date one or two were usually to be found at this place. It was also found on the beaches about the island, and on one occasion was taken on the high open sand dune in the interior. The last bird was seen at the edge of the pond, on October 8.

32. (234) *Tringa canutus.* Knot.—The only birds of this species seen were two found on the west beach, on September 1. They were feeding in shallow water, and the one taken proved to be an adult female in full winter plumage. This species is either raely seen in Michigan, or is not well known to local ornithologists, for very few have been recorded. It is, however, a regular (if rare) migrant along the shores of the Great Lakes. Near Little Oak Point, three of these were seen on August 20 and 21, 1908, by Dr. Ruthven.

33. (241) *Pisobia bairdi.* BAIRD'S SANDPIPER.—This species was first identified on August 23, when two specimens were seen in a flock of least and semipalmated sandpipers. On August 24, three more were seen, but these were the last ones noted. This species is not well known, but doubtless is a regular migrant on the shores of the Great Lakes. At Point Pelee, Lake Erie, the writer found them rather common on August 24-26, 1907, and secured several. It also occurs rarely inland, and there is one in the Museum collection that was taken at Ann Arbor on August 15, 1893.

34. (242) *Pisobia minutilla.* LEAST SANDPIPER.—This sandpiper was found on the island the next day after we arrived there, August 17. It had probably been there for some time in company with the semipalmated sandpiper. It was not common and was last seen on August 29, when an adult female was found in a flock of semipalmated sandpipers. The species is one of the earliest fall migrants in this section, and has been noted at Ann Arbor as early as July 21 (1908).

35. (246) *Ereunetes pusillus.* SEMIPALMATED SANDPIPER.—This species was present when the writer arrived at the island (noted on August 17), and was seen in varying numbers until September 25. On the last date only two were seen. It was the most numerous and tame of all the waders. It also migrates through the interior of the state, and has been noted at Ann Arbor as early as August 8 (1908).

36. (248) *Calidris leucophaea.* SANDERLING.—During the night and early morning of August 20, small flocks of this species came to the island from the northwest. The wind was south and southwest for twenty-four hours, but was not strong. It was last seen on the island on October 7, but a flock was seen at Oak Point, on the mainland, on October 12. This is one of the most common migrants along the shores of the Great Lakes, but is rarely seen inland. The only Ann Arbor record is the four that were seen on August 23, 1899.

37. (254) *Totanus melanoleucus.* GREAT YELLOW-LEGS.—The first bird of this species was noted on August 23, at Rattlesnake Point. No more were seen until October 6, when a pair of birds was seen at the same place. The species also migrates through the interior of the state, and has been taken at Ann Arbor as early as September 21 (1907) and as late as October 22 (1907).

38. (255) *Totanus flavipes.* YELLOW-LEGS.—On August 19, two yellow-legs were seen on the beach near the light-house, but these were the only ones observed on the island. It also migrates through the interior of the state, and has been seen near Ann Ar-

bor as early as July 14 (1909) and July 21 (1909), and as late as October 3 (1908).

39. (256) *Helodromas solitarius solitarius.* Solitary Sandpiper.—This species was on the island when we arrived (August 17), and was generally found on the mud flats about the pond, although it was also occasionally seen on the sandy beach on the east end of the island. The last one seen was on September 24. The species also migrates inland, and has been seen at Ann Arbor as early as July 15 (1910).

40 (263) *Actitis macularia.* Spotted Sandpiper.—This sandpiper was very common on the island and bred in numbers on the sandy beaches. On my first visit to the island (June 3), I saw several pairs on the sand dune near the light-house, and on August 16 it was a very common bird all about the island. The other species of waders came and went, but a few of this species might be seen every day until September 28, when the last one was seen.

41. (270) *Squatarola squatarola.* Black-bellied Plover.—The plover was first seen on August 20, when three birds were observed on the beach at Rattlesnake Point. These were all adults; two were in nearly full spring plumage, and the other was partly changed. On August 22, a flock of twelve adult birds came to the island. Six of these were in the black plumage with only a few white feathers on the throat and neck. These were very conspicuous on the sandy beaches. The other six were more or less spotted with white, and were not so conspicuous. This flock fed on the beaches about the island, but preferred the rocky ones, where I often saw them perched on the big boulders or feeding among the rocks. In these places they fed upon the small water snails. On September 26, only three of this flock remained, one of which was still in the black plumage with some scattered white feathers. The latter bird, with a young one, was secured, and were the last ones seen in this plumage. These adult birds were very shy and difficult to secure, but the young birds, which first made their appearance on September 10, were easily approached. No adult birds came to the island after August 22, and the twelve adults that came at that time, with the addition of the three that came August 20, were the only adult birds seen in a total of over one hundred observed. The keepers of the light said that they had never seen this species on the island in spring, although it no doubt migrates northward along the shores of the Great Lakes. The keepers have seen them as late as November 21 (1909). The species does not usually migrate inland, and has been recorded from Ann Arbor but once, October 5, 1876. It was found in numbers on

Sand Point by Mr. Joseph Singleton, on September 15, 1910, but was not seen there by the Biological Survey party in 1908.

42. (272) *Charadrius dominicus dominicus.* GOLDEN PLOVER.—The golden plover was not seen until September 9, when a single bird, an adult male, came to Light-House Point. On September 10, a flock of six came to the Point in company with a flock of black-bellied plover, and the only one secured was an adult female. The remainder of this flock flew off to the south and was not seen again. The next record was on September 27, when a lone bird, an adult male, was secured on Light-House Point. These birds were all in fall plumage and had no black breast feathers. The last one seen on the island, an immature male, was secured at Rattlesnake Point, by the writer, on October 1. The species is found inland more often than the preceding, and migrates throughout the state, feeding on the dry meadows (in the greatest numbers in the fall). The writer has seen it but once in the spring at Ann Arbor (April 20, 1890), and very few have been recorded. On October 1, 1890, the writer saw a large flock feeding on a high meadow near Ann Arbor, but it has not been seen now for many years in that region. The one secured on October 12, 1895, near Gibralter, at the mouth of the Detroit River, seems to be the only record for the Detroit River region (Auk, 1907, p. 141).

43. (273) *Oxyechus vociferus.* KILLDEER.—This species was first seen at Light-House Point on August 25. On September 21, another was seen at the end of South Point, and one was taken on the east beach September 27. The last was a juvenile male and still had some down on the ends of the tail feathers.

44. (274) *Aegialitis semipalmata.* SEMIPALMATED PLOVER.—The first bird of this species was seen on August 20, on Light-House Point, and on August 21, small flocks came in company with semipalmated sandpipers and sanderling. From the latter date to September 30, they were seen but rarely. Only one or two adult birds were seen, and these were among the first arrivals.

45. (277) *Aegialitis meloda.* PIPING PLOVER.—None of this species were seen on the island by the writer, and Captain McDonald said that he had not observed it in 1910, but that a pair nested near the light-house in 1909. The species was found breeding on the island on May 20, 1903, by Arnold.*

46. (283) *Arenaria interpres morinella.* RUDDY TURNSTONE.—A single bird of this species was seen on the light-house beach on the morning of August 19. It was an adult and partly in spring plumage. The next one seen (August 24) was also an adult bird

* Bull. Mich. Ornith. Club. Vol. IV, No. 3, p. 74.

in nearly perfect spring plumage. These were the only adult birds seen. On August 6, a flock of six was seen on Rattlesnake Point. These were young birds and so fearless that we could walk by them at a distance of fifteen feet without frightening them. The light-house keepers said that the species was common in May and that some were seen as late as June 15. At Point Pelee, Ontario, the earliest record given (Taverner, 1907), is August 24. The turnstone is a regular migrant along the shores of the Great Lakes, rarely going inland. There is no record for Ann Arbor.

47. (316) *Zenaidura macroura carolinensis.* Mourning Dove.—The mourning dove was a rare species on the island, being seen but once, August 19. This bird was no doubt a straggler. It is doubtful if it breeds on the island.

48. (331) *Circus hudsonius.* Marsh Hawk.—This species did not breed on the island, and was first noted on August 23, when an immature bird was seen sailing about over the east end. On August 28, and at various subsequent dates, a few others were seen. The only adult bird (male) was observed on October 8. The rarity of this species on the island is probably caused as much by the absence of mice and the small number of frogs, as to the small number of suitable nesting sites.

49. (332) *Accipiter velox.* Sharp-shinned Hawk.—The sharp-shinned hawk was first seen on September 3, and, while seen at various times after this date it did not become very common at any time. The light-house keepers said that in the spring hawks were abundant and many of them are no doubt of this species. On the east side of the Bay, about twelve miles from the island, a hunter told the writer that small hawks were very abundant for several days in the spring, and that he once shot twenty-seven in a short time. He thought they were of this species. The last birds seen on the island were two that were observed on October 5. No adults were observed.

50. (333) *Accipiter cooperi.* Cooper's Hawk.—Cooper's hawk was seen but twice on the island, on September 6 and 20, These were immature birds.

51. (337) *Buteo borealis borealis.* Red-tailed Hawk.—This hawk was not seen on the island, but the light-house keepers said that it comes there in the spring. On October 12, the writer saw an adult bird soaring over the woods near Oak Point.

52. (352) *Haliæetus leucocephalus leucocephalus.* Bald Eagle. —This species breeds on the island, where there is one nest in an old Norway pine. This nest is mentioned by Arnold,* who says,

* Bull. Mich. Ornith. Club, IV (1903), p. 74.

"a pair of eagles has nested there for many years." One or two birds were seen nearly every day, and they were still there when we left the island (October 11). These birds fed on fish, which were abundant on the shores of the island. On one occasion the writer saw an adult bird drop into the water and rise with a good sized fish in its talons, and at other times it was seen perched on the big boulders on the east point, where it seemed to be watching for fish. Generally, however, the birds were to be seen perched on the tall dead trees along the shore, or soaring about over the water.

53. (356a) *Falco peregrinus anatum.* DUCK HAWK.—This rare and beautiful hawk was first seen on September 20. On this date, as the writer was walking along the east beach, a dark-colored young bird flew past over the water. A long shot failed to bring it down, but it was wounded and was later found in the top of an oak on the sand dunes. On September 22, another dark-colored bird was seen early in the morning, chasing a flock of sanderling at the end of Light-House Point. When it captured a bird it carried it away to a dead cedar tree near the beach and ate it. This hawk was not seen again, and no more came to the island until September 30, when a large bright-plumaged bird was seen but not secured. On October 3, another dark-colored bird was seen on the rocks at the water's edge. This bird flew along the beach and lit on a dead tree on the first sand dune. It was also an immature bird, and on October 5 still another dark-colored bird was observed but not secured. The island seemed to be only a stopping place for this species, which probably does not find much food there, and no ducks at all at this season of the year. The keepers said that it was more common during the spring migration.

54. (357) *Falco columbarius columbarius.* PIGEON HAWK.—On August 30, a hawk of this species was seen on the dead tree where the duck hawk was secured. This bird was eating a small bird. On September 6, another one was observed chasing thrushes, which seemed to be the principal food of the species and which came to the island on the night of September 4-5 in great numbers. The writer's experience with this falcon at Isle Royale, Charity Island, and elsewhere, seems to show that it migrates at the same time as, and no doubt follows, the thrush migration. Eight or ten of these falcons were seen on the island by the writer, and whenever one appeared it was usually seen flying along the beaches, where they sometimes perched on rocks at the water's edge, or on old dead stubs or trees. One was seen chasing a flicker, but the latter with a frightened cry dodged through a tree and escaped. This falcon is even more bold and fearless than the

duck hawk and often flew straight at and over the writer when in plain view. It also came to Light-House Point and often flew over our work camp. Only one of the birds seen (a male) was in the beautiful blue plumage, although one or two others seemed fully adult. On October 10, two of these birds were seen perched on dead trees not far apart, and seemed to be in company. They proved to be an adult male and female and were possibly a pair.

55. (360) *Falco sparverius sparverius.* SPARROW HAWK.—The first sparrow hawk seen on the island was on August 22. Two others were noted on September 5 and 18, and on September 19 three were seen flying about over the beach near the pond. The latter were the last ones seen, and none of those observed stayed more than one or two days on the island. This was no doubt owing to the fact that there were few grasshoppers or other insects for them to feed upon.

56. (364) *Pandion haliaetus carolinensis.* OSPREY.—One osprey was seen soaring about over the Bay near the island, on August 21. The keeper said that it was more common in the spring.

57. (366) *Asio wilsonianus.* LONG-EARED OWL.—This species was not seen by the writer, but Mr. Singleton shot one on the island early in the spring of 1910. This was no doubt a straggler.

58. (367) *Asio flammeus.* SHORT-EARED OWL.—This owl was first seen on September 7, when one was flushed from the rushes on Rattlesnake Point. Others were seen on September 9 and 26, at the same point. It was seen twice at the end of South Point, and once on the sand dune on the east beach. It seemed to be but a rare visitor on the island.

59. (375) *Bubo virginianus virginianus.* GREAT HORNED OWL.—The writer did not see this species, but, during the winter of 1902-1903, three came to the island and were shot in the spring by the keepers because they caught their chickens. Captain McDonald had a photograph of one of these.

60. (376) *Nyctea nyctea.* SNOWY OWL.—This species is given on the authority of Mr. McDonald, who has seen a number on the island in past years. It no doubt occurs there nearly every year, but during migrations only, as there is no permanent food supply.

61. (387) *Coccyzus americanus americanus.* YELLOW-BILLED CUCKOO.—The yellow-billed cuckoo was seen the first day the writer went over the island (August 17), and no doubt belongs in the list of summer residents. It was seen again on August 20 and at later dates until September 10, when it left the island. It seemed more common than the next species, although as shy and hard to observe.

62. (388) *Coccyzus erythrophthalmus.* BLACK-BILLED CUCKOO.—This species was seen first on August 22 and again on September 7, 15 and 20. It no doubt bred on the island, as immature birds were found, and it was probably more common than the number seen indicated, for it is a shy bird and no particular effort was made to find it.

63. (390) *Ceryle alcyon.* BELTED KINGFISHER.—When the writer arrived (August 16), there were several kingfishers on the island. These birds remained until October 9, but only one stayed after this date. It no doubt breeds on the island, but only in small numbers, owing to the lack of suitable breeding sites.

64. (393) *Dryobates villosus leucomelas.* NORTHERN HAIRY WOODPECKER.—This woodpecker is a rare resident and breeds on the island. Only a few were seen by the writer. Captain McDonald told us that it remains all winter in small numbers.

65. (394c) *Dryobates pubescens medianus.* DOWNY WOODPECKER.—Like the preceding this species breeds only in small numbers on the island.

66. (402) *Sphyrapicus varius varius.* YELLOW-BELLIED SAPSUCKER.—The yellow-bellied sapsucker was first seen on September 15, when a single bird was observed. The species did not become common until September 21, when there occurred a migration wave. It became abundant at this time and continued so until September 29, when most of them passed on. A number were still left, however, and a few were seen as late as October 9. The writer never saw so many birds of this species on a given area as on the island during this migration, and Mr. McDonald said that it is even more abundant in the spring. The bark of almost every suitable tree on the island was nearly covered with their work. No nesting cavities were seen, and it probably did not breed there.

67. (406) *Melanerpes erythrocephalus.* RED-HEADED WOODPECKER.—The red-headed woodpecker is a rare breeder on the island and very few, probably not more than one or two broods, were seen. There seemed to be no increase in numbers during any of the migrations. The last one was seen on September 28.

68. (412a) *Colaptes auratus luteus.* NORTHERN FLICKER.—A few flickers were on the island on August 16, but only a few broods were seen until September 6. On the latter date it became very common and was seen feeding everywhere, on the sand dunes as well as in the forest, on ants and the berries of the poison ivy. (The latter grows as a dwarf shrub, one to four feet high, on the islands.) The species continued abundant until October 2, when they nearly all left the island. A few, however, lingered, and two more were seen as late as October 10.

69. (417) *Antrostomus vociferus vociferus.* WHIP-POOR-WILL.—This species evidently did not breed on the island, as none were seen until September 9. On this date, the writer flushed one from the side of the path. This bird was the only one seen and was no doubt a straggler from the mainland.

70. (420) *Chordeiles virginianus virginianus.* NIGHTHAWK.—The nighthawk was not a breeder on the island, and none were seen until August 21, when eight flew over the light-house clearing. It was seen again in the evening on August 22, 23, 25, 28, and September 7.

71. (423) *Chaetura pelagica.* CHIMNEY SWIFT.—A family of four inhabited the light-house chimney during the summer. These birds were seen last on August 19, and no others were observed.

72. (428) *Archilochus colubris.* RUBY-THROATED HUMMINGBIRD.—The writer did not see this species until August 27, and only a few times during migration. It is doubtful if any bred on the island this summer, although it was an abundant migrant in May, when the keepers saw thirty at one time about an apple tree in bloom.

73. (444) *Tyrannus tyrannus.* KINGBIRD.—Kingbirds were found on the island on August 16, and no doubt bred there. They were common and were noted daily until September 5, but after the latter date it was seldom seen. It was not observed at all between September 15 and 27, when the last record was secured.

74. (452) *Myiarchus crinitus.* CRESTED FLYCATCHER.—This species was also found on the island on August 17,, and no doubt nested there. Several were observed until August 19, after which date it was not seen.

75. (456) *Sayornis phoebe.* PHOEBE.—The first record of the occurrence of the phoebe on the island was September 19. It was again observed on September 24, but only rarely between that date and October 8, which was the last time it was seen.

76. (459) *Nuttallornis borealis.* OLIVE-SIDED FLYCATCHER.—This flycatcher was first seen on August 18. It was not a common migrant, although several were noted previous to August 31—the last date upon which it was observed. It seemed to prefer the tops of old dead trees along the east beach.

77. (461) *Myiochanes virens.* WOOD PEWEE.—On August 17, the pewee was common on the island, and it was seen nearly every day until September 20. The last one was observed on the latter date.

78. (463) *Empidonax flaviventris.* YELLOW-BELLIED FLYCATCHER.—The first record for this species was secured on August 29. After that date, it was common until September 6, when it left the

island. It was found feeding in the willows and poplars along the beaches, and was seldom seen in the forest except at the edge.

79. (466a) *Empidonax trailli alnorum.* ALDER FLYCATCHER.—This flycatcher was first seen on August 27, in the willows at the edge of the pond. It was rather common in the bushes about the beaches until September 6, after which it was not observed.

80. (467) *Empidonax minimus.* LEAST FLYCATCHER.—As it was found on the island on August 18 and was occasionally seen until September 21 (the last date on which it was observed), it seems probable that the least flycatcher bred in small numbers on the island.

81. (474) *Otocoris alpestris alpestris.* HORNED LARK.—The horned lark was first seen on the island on September 18, when one bird was observed on the rocky beach at Rattlesnake Point. It was not seen again until the morning of September 24, when a flock of fifty came across the Bay and lit on the ground about the light-house, where the birds fed on the seeds of the beach grasses. On the next day this flock passed on, and no more were seen until September 27, when a smaller flock was seen on the rocks at the end of Light-House Point. This flock passed on the same day, and the species was not seen again until October 1 and 6, a single bird being seen on each of these days. The latter were the last birds seen by the writer, but Captain McDonald said that they become more abundant later in the season.

All of these birds were typical *O. alpestris* and many of them were bright adult birds. Cook* says of this species in Michigan, "Rather rare; irregular fall and spring visitor." The records for Michigan are few, and in the University of Michigan Museum there are but three birds that have been taken in Michigan, one from Montcalm County, one from Isle Royale, and one from Houghton. The reason why only the form *praticola* is found in the interior of the state is perhaps that the typical form follows the shores of the larger bodies of water during migration, preferring to find its food upon the sandy and rocky beaches rather than in the woods and fields of the interior. At Point Pelee this species has never been observed, although, as Taverner (1907-8) has pointed out, "it might be expected to occur."

82. (477) *Cyanocitta cristata cristata.* BLUE JAY.—Although a summer resident, few blue jays were seen until September 17, when a flock of about thirty was observed high in the air and coming from the west. When over the west beach, this flock descended to the tops of the high trees. The resident birds of the island seemed to unite with these and were seen every day flying

* Birds of Michigan. Mich. Agri. Col., Bull. 94, p. 84.

about the island in a loose, irregular flock, which was still present when we left, October 11. On several occasions this flock was seen to start from the south point, and, after flying out over the water, turn and come back to the island again. Mr. McDonald said that some blue jays generally winter on the island, but these are probably migrants from farther north.

83. (488) *Corvus brachyrhynchos brachyrhynchos.* CROW.—The crow was a common breeder on the island and was seen and heard every day during our stay. It was very tame and, during the summer robbed the nests of the poultry at the light-house. On September 14, a large flock of about one hundred came to the island, but this flock was seen only on this day and went on, leaving about the same number of resident ones as before. The keepers said that a few generally stay all winter.

84. (494) *Dolichonyx oryzivorus.* BOBOLINK.—This species was not seen by the writer, but it is listed on the authority of the keepers, who said that flocks are seen here during the spring migration.

85. (495) *Molothrus ater ater.* COWBIRD.—The cowbird was very rare on the island, being seen only once, September 11, when a single individual was observed by the writer. Its absence is peculiar, for on Sand Point, where the conditions are very similar, it is a very common resident.

86. (498) *Agelaius phoeniceus phoeniceus.* RED-WINGED BLACKBIRD.—The writer saw no specimens of this species even during migration. This is rather singular, as it is a not uncommon breeder on Sand Point.

87. (501) *Sturnella magna magna.* MEADOWLARK.—The only bird of this species seen, a beautiful adult male, came to Light-House Point early on the morning of September 29. The keepers said that it is common in spring, migrating in flocks to and across the island.

88. (507) *Icterus galbula.* BALTIMORE ORIOLE.—The writer did not observe the oriole on the island, but lists it on the authority of the keepers, who said that it was very common during the spring migration in May.

89. (509) *Euphagus carolinus.* RUSTY BLACKBIRD.—The first record for this species was secured on September 13. After that date it was seen at various times, and some were still present when the writer left the island. It generally fed along the beaches and near the edge of the water. On October 2, flocks were seen feeding about the heaps of fish refuse on Little Charity Island.

90. (511b) *Quiscalus quiscula æneus.* BRONZED GRACKLE.—This species is listed on the authority of the keepers, who said that it was a common spring migrant.

91. (514) *Hesperiphona vespertina vespertina.* EVENING GROSBEAK.—Captain McDonald informed us that he has occasionally seen this species on the island during the winter and early spring.

92. (515) *Pinicola enucleator leucura.* PINE GROSBEAK.—Captain McDonald informed us that during the nine winters which he has spent on the island this species has been seen nearly every year, in some years being quite common.

93. (517) *Carpodacus purpureus purpureus.* PURPLE FINCH.—The purple finch was seen in flocks on August 20. Another flock of about fifty was seen on August 23 and again on August 25, but none were seen after the last date. It may nest on the island, as it was found breeding on Sand Point in 1908.

94. (521) *Loxia sp.* CROSSBILL.—Captain McDonald informed us that a crossbill winters on the island, but the species could not be determined from his description.

95. (529) *Astragalinus tristis tristis.* GOLDFINCH.—The goldfinch was rare on the island and was not seen until August 26. It may breed on the islands.

96. (534) *Plectrophenax nivalis nivalis.* SNOWFLAKE.—This bird was not seen on the island, but it was found on the shore near Caseville (ten miles to the southeast) on October 12. The keepers told us that it comes to the island in large flocks in late fall and winter.

97. (536) *Calcarius lapponicus lapponicus.* LAPLAND LONGSPUR.—The writer was surprised to find two of this species on the beach near the light-house on the morning of September 30. Again, on October 2, two were seen at Little Charity, and on the next day two more on Charity. These were all the records secured, but the species is no doubt abundant later in the fall and winter.

98. (540) *Pooecetes gramineus gramineus.* VESPER SPARROW.—This sparrow was first seen on August 31, but was quite rare until the migration wave of September 20-21, when it came in some numbers with the Lincoln sparrow. Another wave came on the night of October 5-6, and it was first seen in abundance at this time. It was still common on the island on October 11.

99. (542a) *Passerculus sandwichensis savanna.* SAVANNA SPARROW.—The first bird of this species was seen on August 29, on the west beach of the island. Only a few were seen after this date, until the night of September 3, when great numbers came to the island and were found the next morning on all the beaches and sand dunes, feeding on the seeds of beach grasses and the insects found at the water's edge. These birds were very tame and could be observed at close range. All of them, with the other sparrows

on the island, migrated on the night of September 10, and the next day only a very few were to be seen. On the night of September 12-13, another wave occurred, and the next day they were as numerous as before. Many more came on September 14-15, so that literally thousands were on the island by September 19. Most of them were gone, however, on September 20, and on October 7 the last bird was seen. At Ann Arbor, this species has but once been observed in the fall, September 17-30, 1910.

100. (554) *Zonotrichia leucophrys leucophrys.* White-crowned Sparrow.—The white-crowned sparrow was first seen on September 19, and came on the same migration wave with the Savanna, white-throated and Lincoln sparrows. The white-crowned were at this time all about the light-house clearing, feeding on the seeds of beach grasses, and when alarmed sought cover in the small willows on the first sand dunes. They were also observed feeding and drinking along the beaches. Many of these passed on during the next night, September 19, but another great wave of sparrows occurred on September 29, and this species was to be seen everywhere except in the thick forest. It seemed to prefer the more open areas, such as the sand dunes and beaches, which swarmed with them. Nearly all left the island on the night of October 4, and only a few were seen as late as October 11. At Ann Arbor, the species is rare, and the earliest record is October 3 (1906).

101. (558) *Zonotrichia albicollis.* White-throated Sparrow.—On the morning of September 13, the white-throated sparrow was seen for the first time, and was then generally distributed over the island. As a rule, it kept in the woods and thicker cover than the white-crowned. The most of them passed on during the night of September 19. The largest migration of the species occurred on the night of September 21, and on the following day thousands of this species were seen, generally in the thick forest, but many in the willows on the sand dunes. Another wave came to the island the night of September 28, and the birds that came at this time had mostly moved on by October 1, and by October 5 nearly all had gone. On October 11 only five individuals were to be found. At Ann Arbor, this species arrives as early as September 23 (1906).

102. (559) *Spizella monticola monticola.* Tree Sparrow.—This sparrow was first seen on October 3, on the sand dunes on the west side of the island. It became common on October 6, when hundreds of them were seen. It was still common when the writer left the island, October 11. At Ann Arbor, the species arrives as early as September 20 (1907).

103. (563) *Spizella pusilla pusilla.* Field Sparrow.—The field sparrow probably bred on the island, as it was observed as early

as August 18. But few were seen, however, until September 27, when numbers came to the island. Some were still to be seen on October 11.

104. (567) *Junco hyemalis.* SLATE-COLORED JUNCO.—The first record for the junco was on September 9, when a few were seen on the high sand dune near the light-house. It became common on September 22, and hundreds were seen on that date. Some of these birds passed on in a few days, but the species was common when we left the island, October 11. At Ann Arbor, the earliest record is September 20 (1908).

105. (581) *Melospiza melodia melodia.* SONG SPARROW.—This species was found on the island on August 18, and was a not uncommon breeder in the bushes about the cranberry marsh, the edge of the pond and the shores of the island. It was seen every day until October 19.

106. (583) *Melospiza lincolni lincolni.* LINCOLN'S SPARROW.—The first bird of this species was observed on September 7, when one was flushed from the ground under a juniper bush. It only flew a short distance and lit in another bush, from which it was flushed with difficulty. It then flew a few feet and lit in a low tree and behind the trunk, where it peered out from one side and then the other at its disturber. The species was not seen again until the migration wave of September 14, when several were seen on the first sand dune on the west side, apparently feeding on the seeds of the beach grasses. When flushed the birds would fly to the nearest cover and hide. On September 17, it was found that these birds had gone, but on the night of September 18, another wave arrived, and the birds were common, but only for one day, as they disappeared on the night of September 19. More came on the night of September 21, and were found in numbers on the west beach. Flocks of five and six were constantly seen and readily identified by the short and warbler-like flight. When alarmed they also had a short characteristic call note. The species was last seen on October 1, when five were seen near the pond. Birds that came during each wave were usually found the next day, feeding and resting on the first sand dune on the west side of the island, but those that remained more than one day were found in the interior and about the inland pond, where they fed in the open cranberry marsh, but never far from the border of thick bushes, to which they retreated when disturbed. The writer found, however, that like many of the sparrows and warblers, they could be called by chirping, which made it possible to identify many birds that could not otherwise be seen. By walking quietly along, these sparrows, when flushed, would fly but a short distance, sometimes only a

few feet, and then when called would generally hop on a dead limb in plain view and would often come quite near to the observer. At the slightest movement, however, the birds would take fright and disappear.

The writer has been unable to trace the migration route of this species through the southern part of Michigan or Ontario, as it has but once (October 8, 1881) been observed at Ann Arbor in the fall, and there are but two fall records for Point Pelee, Ontario. W. E. Saunders * found twelve dead birds of this species on the southern shore of Lake Huron, on October 21, 1906.

107. (584) *Melospiza georgiana.* SWAMP SPARROW.—The swamp sparrow was first seen on August 27, but, as it frequented the thick vegetation about the pond, it was no doubt on the island when we arrived, and probably bred there, It was rarely seen until October 4, when it became rather common on the low wet beach on Rattlesnake Point. It was seen there until October 11, and seemed to feed on the open beach close to thick rushes and tall beach grass. These birds were no doubt migrants, as none were seen in this habitat earlier in the season and, in fact, very few anywhere on the island.

108. (585) *Passerella iliaca iliaca.* FOX SPARROW.—This bird was first seen on September 25, and on this date numbers were seen about the pond, where they were feeding on the mud flats exposed by the low water. When alarmed, they flew into the thick willow and rose bushes at the edge of the pond. This was a favorite resort, and most of the birds seen at this time were near this habitat, although it was later seen nearly everywhere on the island, except on the open beaches. It was last seen on October 6, when a single bird was observed. The species appeared to migrate alone. At Ann Arbor it has been seen as early as October 4 (1908).

109. (—) *Passer domesticus.* ENGLISH SPARROW.—None of this species bred on the Charities, and it was only seen when birds came to or across the island. On October 8, a flock of several hundred lit on the old dock and in the tall trees near the light-house. One of the keepers said that he had seen a flock a few days before this.

110. (587) *Pipilo erythrophthalmus erythrophthalmus.* TOWHEE.—The towhee did not breed on the islands, and was not seen until October 2 and 3, when a single bird was observed—on the first date at Little Charity and on the next day on Charity. This may have been the same bird. The species was not seen again during our stay.

* The Auk, Vol. XXIV, pp. 108-110.

111. (598) *Passerina cyanea*, INDIGO BUNTING.—This species evidently did not breed on the island, as it was not seen until September 9. Two birds were seen on that date, and this was the only record secured.

112. (608) *Piranga erythromelas*. SCARLET TANAGER.—The keepers informed us that this bird is common during the spring migration in May. It was not seen by the writer.

113. (611) *Progne subis subis*. PURPLE MARTIN.—On August 16, birds of this species were seen flying about over the light-house. It apparently did not breed on the island, although a common breeder at Caseville and Bayport, and no doubt about the towns on the west shore. The ones seen were doubtless birds from one of these places, that had come out to feed over the bay.

114. (612) *Petrochelidon lunifrons lunifrons*. CLIFF SWALLOW.—The cliff swallow did not breed on the island, but a few were seen flying about the light-house clearing on August 17. These were the only ones seen and may have been migrating.

115. (613) *Hirundo erythrogastra*. BARN SWALLOW.—This species was a rare breeder on the island. One pair was seen on August 16 and subsequently, that had a nest in the top of a partly underground chicken house. The keepers said that another pair tried to build inside of the boat house, but after several successive nests had been destroyed they gave up the attempt and left. On August 20, a flock of about thirty came to the island. They fed and rested for five days and then passed on. The swallows that bred on the island did not migrate with this flock, but disappeared two days later.

116. (619) *Bombycilla cedrorum*. CEDAR WAXWING.—This species bred on the island and was not rare, being seen nearly every day. Young birds just able to fly were observed on August 17, and many in the immature plumage were seen until September 29, when the last birds were noted.

117. (621) *Lanius borealis*. NORTHERN SHRIKE.—Only one of these birds, an adult female, was seen, October 7. It was in the top of a tall Norway pine near the light-house.

118. (624) *Vireosylva olivacea*. RED-EYED VIREO.—The red-eyed vireo bred on the island, and was seen from August 17 to September 28. A nest was found in a tree near the light-house and young and immature birds were common.

119. (627) *Vircosylva gilva gilva*. WARBLING VIREO.—This vireo probably bred on the island, but not so commonly as the preceding species. It was first seen on August 17, and but a few times afterward, never becoming common.

120. (628) *Lanivireo flavifrons.* YELLOW-THROATED VIREO.—Single birds of this species were observed on September 19 and 20. Both were in oak trees near the edge of the forest at the east end of the island.

121. (629) *Lanivireo solitarius solitarius.* BLUE-HEADED VIREO.—A bird of this species was seen on September 23, in an oak tree near the north shore. Another was observed on September 27, in a poplar tree near the path across the island, and, in the same place, two more on September 28, one on September 29, and one on September 30. No others were seen on Charity Island, but one was found on Little Charity on October 2. This species seemed to prefer the deciduous trees of the interior of the island.

122. (636) *Mniotilta varia.* BLACK AND WHITE WARBLER.—This species was first seen on August 26. It became quite common on August 28, and was mostly in company with red-breasted nuthatches. In its search for food, it acted very much like the latter, creeping about on the dead limbs of the trees. After August 29, it was not found again until September 17 and 28, when single birds were seen.

123. (642) *Vermivora chrysoptera.* GOLDEN-WINGED WARBLER.—An adult male of this species was found feeding on the poplar trees at the edge of the pond, on September 16.

124. (645) *Vermivora rubricapilla rubricapilla.* NASHVILLE WARBLER.—The Nashville warbler was first seen on August 26, but no more were observed until September 21. A few were seen again on September 23.

125. (646) *Vermivora celata celata.* ORANGE-CROWNED WARBLER.—On September 29, the writer observed a small flock of this species feeding in small poplars at the edge of a white pine grove. The birds flew from tree to tree and were very restless, only stopping for a moment to feed. One or two flew down to low bushes to look for food. The only fall record we have for Ann Arbor is October 3, 1906.

126. (648a) *Compsothlypis americana usneæ.* NORTHERN PARULA WARBLER.—Two parula warblers were seen in oak trees near the west side of the island, on September 26. This species is also rarely seen at Ann Arbor in the fall; the earliest record is September 27 (1908).

127. (650) *Dendroica tigrina.* CAPE MAY WARBLER.—The first record for this species was secured on the morning of August 22, when the writer saw several in company with prairie and bay-breasted warblers. This flock had evidently arrived in the night, and when seen the birds were feeding in some low trees near the light-house. After this date the species became quite common, and

was seen at intervals of a few days until October 3, when the writer observed three. It has been seen at Ann Arbor as early as September 9 and as late as September 27 (1908).

128. (652) *Dendroica æstiva æstiva.* YELLOW WARBLER.—The yellow warbler was a rare breeder on the island. It was seen on our arrival, and after this until September 9.

129. (654) *Dendroica cærulescens cærulescens.* BLACK-THROATED BLUE WARBLER.—This species was first seen on August 31, in low trees near the path across the island. No more were seen until September 13, and it did not become common until September 26, when a migration occurred. The bulk of the birds that arrived on this date passed on the next night, and only a few were seen on the island until the night of October 5, when hundreds of them arrived with great numbers of palm, myrtle and black-throated green warblers. These passed on the next night, and no more black-throated blue warblers were seen.

130. (655) *Dendroica coronata.* MYRTLE WARBLER.—The first myrtle warblers were seen on August 28, when a few were found in company with the bay-breasted near the light-house. No more were seen until September 15 and 16, after which a few were observed on the island until the night of October 5, when thousands of them arrived in company with other warblers, mostly the palm. The last of this migration crossed the bay early in the morning, and, as the wind blew very strongly, they flew low and alighted on the ground all about the light-house and in the clearing. The bushes and tall grass surrounding the clearing were alive with them at this time. I noticed them feeding on seeds of the beach grasses and also on the flies that covered the sides of the house. The birds fed on the latter until they were gone, and then left the clearing (about 10 a. m.) and scattered over the island in search of food. The birds were very tame. On October 7, only ten were found, and this number was about all that were seen on any day afterward.

131. (657) *Dendroica magnolia.* MAGNOLIA WARBLER.—The first bird of this species was seen on August 18, when an immature specimen was found in low willows near the east beach. It was next seen on August 24 and 26, near the light-house, and after this from one to three birds were seen on various dates until October 6.

132. (659) *Dendroica pensylvanica.* CHESTNUT-SIDED WARBLER.—This warbler evidently did not breed on the island, owing perhaps to the absence of favorable conditions. A few were seen on September 15 and September 29.

133. (660) *Dendroica castanea.* BAY-BREASTED WARBLER.—This species was first seen on August 27, when a small flock came to

the island and fed in some trees near the light-house. After this date, the species was seen every day until October 12, and was by far the most abundant bird on the island. It was found everywhere, feeding on the ground as well as in the tallest trees, and even at the water's edge on the rocky beach. On the night of September 3, a large migration occurred, and the bulk of the migrants were of this species. Thousands were seen about the light-house at this time, and considerable numbers in the trees all over the island, but on September 13 only three could be found. On September 16, it was again common and continued so until October 6, when nearly all disappeared. At Ann Arbor, it has been taken as early as September 5 (1896), and is often very common.

134. (661) *Dendroica striata.* BLACK-POLL WARBLER.—This warbler was one of the rarest on the island and was only seen but a few times. The first one observed was on September 5. Two more (the last seen) were found on September 9. At Ann Arbor, this species has been seen as early as September 9 (1907), but it is never as common as the preceding.

135. (662) *Dendroica fusca.* BLACKBURNIAN WARBLER.—This warbler was first seen on August 26, but not again until September 5, when one was found dead under the light-house. The latter was the last record secured. Its rarity is surprising, as it was found to be rather common on Sand Point in June, July and August, 1908, and it also breeds on the mainland west and northwest of the island. At Ann Arbor it has been seen as early as August 23 (1908).

136. (667) *Dendroica virens.* BLACK-THROATED GREEN WARBLER.—The first record for the black-throated green warbler was secured on September 8. After this date, a few birds were seen on September 19, 21, 27, 28 and 29. On October 6, the birds came to the island in numbers with the myrtle and black-throated blue warblers. All disappeared on the next night and no more were seen. The species may breed on the island, as it was found breeding on Sand Point in June, 1908. It is a common breeder on the mainland west and northwest of the island. It has been observed at Ann Arbor as early as September 8 (1907).

137. (672) *Dendroica palmarum palmarum.* PALM WARBLER.—On August 24, the first individual of this species was seen in the trees near the light-house. It was not observed again until September 5, when it came in small numbers with a big migration wave of warblers, thrushes and vireos. It did not become common, however, until September 13, when there occurred another big migration wave of warblers and sparrows. This species was then represented by considerable numbers. Another wave occurred

on the night of September 18, and on the morning of the 19th the species was very abundant. There must have been thousands of individuals about the light-house, where they fed partly on flies that collected on the window screens and sides of the house, and apparently also on ground insects, and possibly seeds of the beach grasses. Over the rest of the island they were rather generally distributed, but showed some preference for the open beaches and sand dunes. These birds all passed on during the next night, and on September 20, and afterward, only a few were seen until the night of October 5, when the largest wave of warblers and sparrows reached the island. Among the birds in this movement there were thousands of this species and of the myrtle, and large numbers of black-throated blue, and black-throated green warblers, American redstarts, juncos, vesper sparrows, and a few horned larks. These all came about the light-house and buildings and lit on the ground, on the steps, window ledges and screens, where they soon devoured most of the numerous house flies. By October 11 the palms had disappeared, with the exception of a very few. But one fall record is known for Ann Arbor, October 1, 1896.

138. (673) *Dendroica discolor*. PRAIRIE WARBLER.—This warbler was first seen on the morning of August 22, when several were observed with Cape May warblers in small trees near the light-house. On August 24, the writer saw three more, the last found.

139. (674) *Sciurus aurocapillus*. OVEN-BIRD.—The oven-bird was found on August 31, when the writer saw several along the path through the woods. It was not seen again until September 5, and after this only occasionally until September 30, when the last one was noted. These birds were always on the ground under low bushes and tall ferns, and could only be seen by calling, when they would fly up into a low tree or on a bare log, often coming within a few feet of the observer.

140. (675a) *Sciurus noveboracensis notabilis*. GRINNELL'S WATER-THRUSH.—What seemed to be a family of this species was found on August 17. The probabilities are that these were migrants. It breeds in the northern peninsula and migrates early, as it came to Sand Point on August 5, 1908, and was present there until August 14. The last one seen on Charity Island was on August 22. All of the Michigan water-thrushes seem to belong to this sub-species, and it is doubtful if any typical *noveboracensis* are to be found in the Great Lakes region. On the other hand, many birds that are intermediate between the two forms are found, which seems to show that the forms intergrade near this region.

141. (678) *Oporornis agilis.* CONNECTICUT WARBLER.—This species was first seen on the morning of August 31, near the path across the island. The preceding night had been clear and cool, with a strong northeast wind. The species arrived with the ovenbird and mourning warbler, remained fairly common until September 9, and was seen as late as September 19. It was only observed in the interior of the island, where it fed under tall ferns that grew in profusion there. By walking quietly and slowly and stopping to call, birds of this species, if within hearing, would usually hop or fly up into the low branches of trees or on logs. They would come quite close to the observer, but generally disappeared promptly when they got a good look at the intruder. Some were called out of low thickets, but most of them seemed to feed in the thick ferns in the more open places in the woods.

142. (685) *Wilsonia pusilla pusilla.* WILSON'S WARBLER.—The first bird of this species was seen on September 7, when the writer secured one in the poplar trees near the path across the island. This was the only one seen in the interior, but a few hours later another was seen in a low maple near the beach at the south end of the island.

143. (686) *Wilsonia canadensis.* CANADA WARBLER.—On August 27, several Canadian warblers were seen in low willow bushes on the first sand dune on the west side of the island. It was not noted again until September 8 and 9, and other records were secured on September 13 and 15. At Ann Arbor, the species has been seen as early as August 23 (1908), and at Point Pelee on August 15 and 16 (1908).

144. (687) *Setophaga ruticilla.* REDSTART.—This species was a not uncommon breeder on the island. On the night of September 4, numbers came with the migration of warblers, thrushes and vireos, but by September 10 none could be found. On September 13, a few more came and were seen almost daily until the night of October 5, when their number was increased by hundreds that arrived with the migration of palm and myrtle warblers. The redstarts all disappeared on the next night, and no more were seen on the island.

145. (697) *Anthus rubescens.* PIPIT.—Early on the morning of September 19, the writer observed a flock of about twenty of this species on the west beach. The birds were walking about and feeding among the rocks. This flock was very wild, and when disturbed flew off toward Sand Point. No more were seen until September 23, when a flock of fifteen came to the light-house beach. This flock was increased to about fifty the next day, but these passed on during the next few days, and on September 27 but one

was to be found. On October 1, two more—the last ones—were seen. This species always lit on the rocky beaches and fed there, and in the beach grass on the first sand dune. They were rather shy and quite difficult to approach.

146. (704) *Dumetella carolinensis.* CATBIRD.—This species was found on our arrival at the island, August 16, but could only have been a rare breeder, as this bird was the only one seen during our stay.

147. (705) *Toxostoma rufum.* BROWN THRASHER.—The brown thrasher was not seen until September 15, when one was observed in the willows on the west sand dune. The next day several were seen in the same locality. These probably came to the island with the migration of thrushes on the night before. On September 21, one was seen at the west side of the pond, and single birds were noted on September 26, 29 and 30.

148. (721) *Troglodytes aëdon aëdon.* HOUSE WREN.—This wren was not found on the island until September 8 (one specimen). Another was noted on September 9, and a third and last one on September 15. The birds were found in the more open part of the island, about the tops of fallen trees and the brush piles.

149. (722) *Nannus hiemalis hiemalis.* WINTER WREN.—A single bird of this species was seen on August 29, in the low willows that border the first sand dune on the west side of the island. Another was noted on September 13, and on September 19 several more were observed. After the latter date it was rather common until October 8, when it was last seen.

150. (724) *Cistothorus stellaris.* SHORT-BILLED MARSH WREN.—Only one specimen of this marsh wren was seen on the island. This bird was secured in the cranberry marsh at the edge of the pond on September 16. It flew up from the coarse grass and lit in a willow bush. This record is the most northern one known to the writer.

151. (726) *Certhia familiaris americana.* BROWN CREEPER.—The first record for this species was secured on September 3, when one was observed climbing up a large oak tree near the path across the island. Another was seen on September 6, but no more until September 14, when several were seen. On September 26 it came to the island in some numbers, twenty being seen on that date. The last one was seen on October 6.

152. (727) *Sitta carolinensis carolinensis.* WHITE-BREASTED NUTHATCH.—If this nuthatch bred on the island it was in very small numbers. A single bird was observed on August 31, another on September 14, a third on September 28, and a fourth and last on

October 1. The scarcity of the species is hard to account for, as there were plenty of hollows for nesting sites, and no evident scarcity of food.

153. (728) *Sitta canadensis.* RED-BREASTED NUTHATCH.—This species was found on the island on August 18. It may have bred there, as several were seen on that date and the species breeds on the mainland in this latitude. It became common on August 26 and continued so until September 7, when it became abundant. Most of them passed on within a day or so after the latter date, leaving only a few on the island. Two more were seen on October 11, the last day of our stay. At Ann Arbor, this species has been seen as early as September 10 (1908).

154. (735) *Penthestes atricapillus atricapillus.* CHICKADEE.—The chickadee was found on our arrival at the island, on August 16, and a few no doubt bred there. Small flocks were seen almost daily until October 8. The birds were found in low willows along the beach, as well as in the pines of the interior, often in company with the red-breasted nuthatch and flocks of warblers.

155. (748) *Regulus satrapa satrapa.* GOLDEN-CROWNED KINGLET.—This kinglet was first seen on September 20, but it did not become common until September 26, when it came to the island in some numbers with the next species. It was found all over the island, but seemed to prefer the tops of the pines as a feeding place. The numbers appeared to increase until September 29, on which date hundreds were observed. On September 30, only a few birds were seen, but it was still on the island when we left it, October 11. At Ann Arbor, it has been seen as early as September 23 (1906).

156. (749) *Regulus calendula calendula.* RUBY-CROWNED KINGLET.—The ruby-crowned kinglet was first noted on September 19. It became common on September 26, when it was observed in large numbers all over the island, with flocks of the golden-crowned. This species also fed mostly in the pine trees. Most of the birds disappeared on September 29, but a few were seen as late as October 11.

157. (756) *Hylocichla fuscescens fuscescens.* VEERY.—Three records of this species were secured, September 3, 5 and 7. It no doubt came with the migration of thrushes, mostly olive-backed. It has been found nesting at Ann Arbor by the writer (May 24, 1904), but as a rule it breeds farther north.

158. (757) *Hylocichla aliciæ aliciæ.* GRAY-CHEEKED THRUSH.—This thrush was first noted on September 14, and the next day numbers were seen all over the interior of the island. On Sep-

tember 28 and 29, a great increase in numbers was noted, but most of these passed on during the night of October 2, and the last were seen on October 7.

159. (758a) *Hylocichla ustulata swainsoni.* OLIVE-BACKED THRUSH.—On the night of September 4, there occurred a large migration of thrushes, mostly of this species. The night was warm, and at midnight a storm came up from the northeast. Thousands of birds came to the light, and great numbers were seen to be of this species. The darkness and the rain confused them, and many came close enough to the light to make identification certain. Some struck the glass and were killed, while others fluttered around and against it, calling loudly all the while. All the thrushes that were killed belonged to this species. By September 10, it was scarce and remained so until September 28, when it again became common. The last were seen on October 7.

160. (759b) *Hylocichla guttata pallasi.* HERMIT THRUSH.—This species was first seen on September 15, and it was only occasionally observed after that until September 29, when hundreds came to the island, with the olive-backed and gray-cheeked thrushes. These nearly all left the island on the night of October 5, and none were seen after October 7.

161. (761) *Planesticus migratorius migratorius.* ROBIN.—A few robins were found on the island when we arrived, and both old and young birds were noted. The keepers said that a few were seen about the pond during the summer. Only a few were seen until August 31, when some migrants arrived. The birds were often seen on the mud flats at the edge of the pond, and they also fed on the bearberries at the edge of the woods near by. On October 1, they became common and continued so as long as we remained on the island.

162. (766) *Sialia sialis sialis.* BLUEBIRD.—No bluebirds were seen by the writer, but Captain McDonald said that the species is very common during migration in the spring and fall. According to him, it comes in flocks in the latter part of October and early November.

Fig. 1. Nestlings of the Barred Owl (*Syrnium varium*) at the time of leaving the nest. Dr. Shufeldt photo: from life.

PLUMAGES OF THE YOUNG OF THE BARRED OWL.

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(Photos from Life by the Author.)

Ornithologists in this country have, as a rule, paid but little attention in their writings to the characters and coloration of the plumage of the nestlings of birds, or during the various stages of their sub-adult life. This fact I have pointed out in various articles published during the past twenty-five years or more, and especially in one entitled "The Study of Nestling Birds," which appeared in *The Atlantic Slope Naturalist* in 1903 (Vol. 1, No. 4, Sept. and Oct., p. 37–44), and another which appeared in *Natur und Haus* during the same year, entitled, "Das Studium der Nestlinge" (Jahr. xii. Heft, 4, p. 49–53).

In the present article this important subject will be further illustrated by selecting the first plumages of the Barred Owl (*Strix varia varia*) as an example of the extent of the attention ornithologists have bestowed upon such matters.

For instance, if we choose Wilson as an authority we find he states in his own account of that bird that he "At another time, in passing through the woods, perceived something white, on the high shaded branch of a tree, close to the trunk, that, as I thought, looked like a cat asleep. Unable to satisfy myself, I was induced to fire, when to my surprise and regret, four young Owls, [*Strix nebulosa*] of this same species, nearly full grown, came down headlong, and, fluttering for a few moments, died at my feet." Here was an excellent opportunity to describe in a few lines the plumage of the young of this Owl, but he never availed himself of it. That these four young owls looked like a "white cat" in the tree goes for little, especially in view of the fact that there were probably plenty of black cats in Wilson's time.

Audubon, who enjoyed for many years abundant opportunity to study the Barred Owl, makes no reference whatever to

the young of that species in his *Birds of America,* and his description of the plumage and its color in the adult is extremely vague and unsatisfactory.

Coues in the Fifth Edition of his *Key to North American Birds,* has nothing to say about the young of any of the Barred Owls, at any stage of their development.

Ridgway in his *Manual of North American Birds,* under the description of the Barred Owl (*S. nebulosum*) offers us one of the plumages of the young of this species, with respect to color and character of markings. This description evidently refers to the young at the time of leaving the nest, although the author does not so state. This I take to be so from the fact that he says of the "*Young*: Head, neck, and entire lower parts broadly barred with rather light umber-brown and pale buffy and whitish, the brown and lighter bars about equal in width." Now if Figs. 1 and 2 of the present article are compared, it will be observed that in the nestling the markings consist of very irregular lines, and by no means definite bars (Fig. 1), while in the young bird-of-the-year, the lower parts are marked by broken longitudinal stripes. (Fig. 2). Hence, Ridgway's description, to say the least, is rather faulty. As a matter of fact the lower parts in the nestling are both irregularly "barred and spotted with shades of brown," as I state in my *Chapters on the Natural History of the United States* (1897, p. 240).

In the work referred to I give a full-page plate of a nestling of the species, which is a reproduction of a photograph from life made by myself. The markings are here beautifully shown, and these instead of being transverse bars, are, in reality, short, irregular, broken lines and, in some instances, spots.

So it goes for the most part throughout ornithological literature,—the descriptions of the plumages of the nestlings or the sub-adult forms of most species of birds have been either entirely omitted, or else incorrectly, shiftlessly or insufficiently recorded. In nearly all instances, a knowledge of such matters is of the greatest importance as shedding light upon the

Fig. 2 Barred Owl: young bird of-the-year (*Syrnium varium*)
Photo. from life by the author.

subject of the ancestry of birds and their affinities within the Class, and to this truth the Owls form no exception.

I have made and published numerous photographs from life of the Barred Owl and other species of the *Strigidæ*, but the figures illustrating the present article have never heretofore appeared in any ornithological publication, and, in the case of Figure 2, anywhere at all.

BIRDS OF A CANADIAN PEAT BOG.

BY C. W. G. EIFRIG.

A Canadian peat bog is a thing at once sought and delighted in, and on the other hand shunned and abhorred. It is shunned and avoided by nearly all classes of human society, that know of nothing but work, the amassing of money, and of pleasure in the old, accepted sense of the word. Such people cannot understand why a person should go to such an uninviting place, where one is drenched from underneath by water, visible or invisible in the deep moss, and also by the perspiration, wrung out of a person by the hot sun, under which one has to wade through the deep vegetation, without being able to walk in the shade. Add to this the hordes of mosquitoes, lack of drinking water, the distances one usually has to tramp, often enough in wet clothing, etc., makes a condition of things which to invade without necessity, yes, even to find pleasure and profit in, seems to them nothing short of a sign of a serious affection of the brain. And yet, naturalists of several kinds, the botanist, entomologist, particularly the ornithologist, congratulate themselves, when they have such a bog in their neighborhood, and go there as often as they have an opportunity.

Six miles east of Ottawa, the beautiful Capital of Canada and the former place of residence of the writer, there is such a bog of ample dimensions and bogginess, called the Mer Bleue. It is about ten miles long by one to four miles wide,

and is situated between the Ottawa-Montreal branch of the Canadian Pacific and Grand Trunk railways. There is farming country all around, terminating in low ridges or rounded bluffs at the margin of the bog, showing plainly its lacustrine origin. Some of these ridges in fact penetrate into the bog from the western end or from the sides, and here and there in the bog are elevations of rock and solid earth, evidently islands of a former time. Into this bog the writer has made incursions in June, July and August of nearly every summer during the six years of his residence here. One cannot go much before June, as the water is then too deep; and, as the breeding species of birds have then not yet settled down, it would not be so profitable.

Like most, if not all peat bogs, also this one has a zone or fringe of quite different appearance than the bog itself. It is a fringe of typical *swamp,* not bog, with much — uncomfortably much, visible water. This fringe of swamp, in most places only twenty-five to fifty feet in width, is effectual in keeping out all but the most ardent naturalists. Here we find the typical swamp flora, alder, cat-tail, poplar, bog-bean, *Lysimachia thyrsiflora,* etc. The typical birds of this section are, the Red-winged Blackbird, with a few Bronzed Grackles mixed in, also the Swamp Sparrow, Yellow Warbler and in some of the poplar stands is found the Nashville Warbler. Now and then a Bittern or even a Great Blue Heron is made to rise and heavily wing away. Also Soras and Virginia Rails are found in here, as well as a few loudly rasping, scolding Short-billed Marsh Wrens (*Cistothorus stellaris*). Of these the Yellow-throat and Nashville Warbler are also found in the bog proper.

The appearance of the bog is such as to at once arouse attention. The vegetation is so different from that of any other kind of territory, that one is almost forced to understand that the biological conditions obtaining here are markedly different from those of most other places. The covering underneath, into which the foot sinks deeply, consists of sphagnum moss, one of the characteristic plants of the peat

bog. In most places water gathers at once around the foot in the moss, which is like a sponge soaked full of water. Soon the eye is attracted by the odd leaves and flowers of the pitcher plant (*Sarracenia purpurea*), most of whose leave-pitchers, bristle-beset, are filled with water also. When one comes upon a colony of large, luxuriant pitcher-plants, it is a sight not soon forgotten, during the spell of which, while gazing on, one is apt to forget all about birds. Besides sphagum the characteristic peat bog flora consists of such thick-leaved, glaucous bushes as *Cassandra, Chamaedaphne calyculata, Andromeda glaucophylla, Kalmia prolifolia, Ledum groenlandicum*, different kinds of huckle- and blueberries, also large and small cranberries. Here and there are a number of small, stunted black spruce and tamarack trees, which in places form thickets, with now and then a patch of deciduous bushes, as *Cornus*, alder, viburnum, etc., between. In such patches are found the Canadian and Chestnut-sided Warblers, also a few Magnolia and Blackburnian Warblers.

But these are not the characteristic bog birds. Out in the open, where grow small, dwarfed spruces, with much space between them, we hear a song much like that of the Pine Warbler, or Chipping Sparow. There the bird is perching in a spruce. It turns out to be a Yellow Palm Warbler, *Dendroica palmarum hypochrysea*. The Palm Warbler, *D. palmarum*, also occurs in the region, but apparently only as a migrant, and it seems as if *hypochrysea* arrives here before *palmarum*, as a nest of the former, containing four eggs, was found as early as May 23, (1908). Here, where single stems of wooly-headed *Eriphorum callitris* stick up from the sphagnum, and, in August, the beautiful White-fringed Orchis, *Habenaria blephariglottis*, is also the home of the White-throated Sparrow. His slow, measured song of various numbers of syllables can be heard on all sides. Canadians make it say, *Dear, dear, Canada, Canada, Canada.* Once, while resting from the laborious, heavy walking or wading under a hot sun, one struck up his tune near me, and,

having note book and pencil in hand, I noted down the number of syllables, with this result:

Four times a song of three syllables.
Once a song of four syllables.
Once a song of five syllables.
Twice a song of six syllables.
Once a song of seven syllables.
Twice a song of nine syllables.
Once a song of ten syllables.

All this in less than fifteen minutes. Here, in the open spruce and tamarack stands, may also be heard the songs of the Hermit Thrush and the Veery, *Hylocichla guttata pallasi* and *H. fuscescens*, often during the greatest heat of midday. Of other thrushes I have seen only one Wood Thrush, and, strangely enough, the Bluebird. Beside *Zonotrichia albicollis* the following members of the finch and sparrow family are met with: the Song Sparrow, Swamp Sparrow, Chipping Sparrow, many Goldfinches, and a few Juncos.

In such a paradise for mosquitoes, flies, and moths, as a peat bog is, flycatchers are to be expected. And accordingly, on the various visits, I found no less than seven species here. Out in the alder fringe, which is repeated around every "island," the Alder Flycatcher, *Empidonax trailli alnorum* is to be heard more than seen. This species certainly knows how to keep out of sight. In the open bog the twittering song and rapidly vibrating form of our old orchard acquaintance, the Kingbird,may be heard and seen. This is a rather common species here. June 16, 1905, I found a nest in a cavity on top of a stump of a small spruce, containing three eggs, with very little nesting material in the cavity. At the edge of some of the taller and denser spruce thickets may be heard the *Hood take care*, of the Olive-sided Flycatcher, *Nuttalornis borealis*, a bird extremely partial to black spruces, preferably at the edge of some open water. If one is fortunate he may also hear another flycatcher call, similar to that of the Pewee, but richer in quality, resembling in that the Crested Flycatcher. This is the elusive Yellow-bellied Fly-

catcher, *Empidonax flaviventris,* in his breeding haunts. To me his call sounds, *Doi de woit!* The mosquitoes, however, are too thick, the spruces too dense, and the heat too great in the thickets, to look for nests. When going to an island in the bog, the only places where one may sit down without getting wet, and eat his lunch, the other members of the flycatcher family may be seen, the Crested, the Pewee and even the Phoebe. Here also the Canadian Ruffed Grouse, *Bonasa umbellus togata,* may be flushed, and the Nashville Warbler, *Vermivora rubricapilla*, heard to sing his little ditty, *Chippa chippa chippa chit churr,* or, *tshewit, tshewit, trr.* Other common *terra firma* species here, are the Purple Finch, Rose-breasted Grosbeak, Northern Flicker, Red-eyed Vireo, Redstart and Black-throated Blue Warbler, *Dendronica caerulescens.*

However, the thicket where lives the Yellow-bellied Flycatcher harbors another interesting tenant. He announces himself by a very unusual song. This is a thin, high, wiry performance, reminding one at once of the songs of the Black and White, Blackpoll, and Nashville Warblers. But this has a queer, ventriloquial quality about it, one never knows where it emanates from. It sounds as if it started on the interior of the tree, and, rapidly accelerating, it becomse a little louder, as if the bird came out along the branch to its end. This is the Golden-crowned Kinglet, also in its breeding haunts. To look for a nest here, would be like looking for the proverbial needle in the haystack. The Black and White Warbler is found here also.

The flycatchers, however, are not the only ones reaping a rich harvest from the innumerable insects flying about during a warm sunny day. Those past masters in the art of flying, the Chimney Swifts, Nighthawks, Barn and Tree Swallows, and even Cedar Waxwings ar found plying the same trade. The Barn Swallows and Swifts, of course, come from the adjoining farms, unless there are some hollow trees large enough for nesting and lodging quarters for the latter, on one or the other of the islands; in the bog there are none.

The tree swallows rest in the alder-poplar fringe on the margin and around the islands. The Cedarbirds later on, when the berries ripen, reap a rich harvest in them. Toward the end of August these various large and small berry-bearing shrubs, such as high and low huckleberries, large and small cranberries and blueberries *Viburnum alnifolium*, *Nemopanthus mucronata*, etc., are fairly alive with birds. Then the Cedarbird is in its glory, but also the Robin, Catbird, Brown Thrasher, Flicker and others invade the bog and share in the rich feast. Then also the Myrtle Warbler, *Dendroica coronata*, is more apparent than earlier in the season; it breeds here sparingly and its soft, babbling little warble, *Whit, whit whit whit drrrr*, something like the Nashville Warbler, is seldom heard.—Of the wren family, the House Wren only is by no means rare in the bog; and in the spruces Blue Jays and Chickadees are frequently heard or seen.

Of birds of prey, I have seen comparatively few. Now and then a Marsh Hawk gets up and circles overhead to watch the movements of the intruder. But the Sharp-shinned Hawk, *Accipiter velox*, seems to prefer the little, thickly branched spruces found here for his nesting sites. On June 3, 1909, I found the rather bulky nest of a pair in the top of a small spruce, about twelve feet up, with four eggs. The female stayed on till the ascent was begun, then she flew off noiselessly. Not so noiseless, however, were a pair or two in a stand of larger spruces at the eastern end of the bog, near some fine *Arethusa bulbosa* and *Pogonia ophioglossoides*. These had the young ones out of the nest—it was August 23,—and resented any intrusion with loud protests, showing little fear of me.

Another interesting feature in connection with visits to the bog, is to see how on different days in the summer months, the different birds in turn predominate, or make themselves most apparent. While at one time the Whitethroats are most noticeable, and the Yellow Palm Warblers are out of sight, the next time the reverse may be the case. Thus on August 5, 1909, *hypochrysea* was very apparent,

wandering with their fully grown young even on the farming land adjoining the bog. On some days the Cedar Waxwings play the leading role, then the Kingbirds, another time the Tree Swallows or even the Song Sparrow. Thus the peat bog, so dreary and monotonous to the uninitiated, presents many delightful and varying aspects and pictures to the devotees of nature-lore, who venture into it.

TWO SPECIES NEW TO THE A. O. U. CHECK-LIST.

BY W. F. HENNINGER.

In the "Dansk Ornithol. Foren Tidskrift IV" on page 130 there is an article by O. Helms entitled: "Nye Arter for Oestgroenland," which mentions four species new to East Greenland, *Marila marila, Falco peregrinus, Colymbus griseigenus* and *Totanus totanus*. There is no particular interest attached to the first two, but the other two, *Totanus totanus* and *Colymbus griseigenus* are new to the A. O. U. Check-List. The former has a hypothetical record for North America, but this is the first time we have a positive record, while the second one has never before been recorded from the neararctic region. I propose that these two species be therefore added to the A. O. U. Check-List and interpolated at the proper places.

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Editorial

The September number of the Bulletin will be wholly given over to Mr. Frank L. Burns' "A Monograph of the Broad-winged Hawk." It will cover some 150 pages of the regular size, and will be amply illustrated. This is the work upon which Mr. Burns has been engaged for a number of years, and will come nearer being a complete life history of this hawk than anything that has been done for any other species thus far. This paper is an illustration of what the Wilson Ornithological Club was organized to accomplish through its method of coöperation in bird study. We have no need to commend the paper to anybody, for it commends itself.

In another place in this issue there will be found a brief account of a summer bird course which is being offered to interested persons in general. In continuation of the work attempted last summer on Pelee Island, Ontario, by the writer and his company of eight students, August and the first half of September of

the present summer will be spent on Point Pelee, Ontario, in further studies of the southward movements of the birds in that especially favored place. Ten students will participate in the work, and it is hoped that they may be so distributed as to trace the direction of large flights, if any such occur. It is hardly necessary to state that these late summer classes are the direct result of the attention which has been given to the study of birds at Oberlin College since 1895, when the first class for bird study was organized in any American college. Now that the birds are receiving some attention, at least, in the public schools and in many colleges, we may confidently expect that there will be many young men and women with sufficient knowledge of and interest in birds to make many other special summer investigations possible. There is great need for studies of this special nature at all times of year, and we expect to see something of this kind done in the not distant future, especially for the spring movements in especially favorable places. Is it too much to expect that ere long the present practice of so many people of rushing off to some popular or fashionable summer resort, from which they are more than likely to return more worn than when they went, will give place to plans for spending that time in some healthful place where birds and other creatures may be studied and enjoyed, and where some real rest and recreation may be gained along with keen pleasure in delving into the secrets of this wonderful world all about us?

The first article in the May-June number of "The Condor," "The Literary and Other Principles in Ornithological Writing," by Milton S. Ray, is, to our mind, well chosen and well done. Mr. Ray's plea for readableness in ornithological writings, and his protest that simply because it is readable it is therefore not scientific, ought to be given honest consideration. It is too true of scientific writings in general that they are put into such unnecessarily technical language, often, that they become wholly unavailable to any but the initiated in that particular branch of science. This ought not so to be. The world is entitled to the results of investigations for which it is always paying in the setting apart of such investigators for their special work and thus removing them from the great army who are carrying the burden of the "day's work." We earnestly second Mr. Ray's plea for "set vernacular names based on the true relationships of birds." There is really no sound reason why this cannot be done. If it be objected that by so doing much of the sentiment of bird study would be sacrificed, we reply that this would be true of only those per-

sons who would not in any event use names accurately. We have never been quite able to understand why a paper which states at the outset that the names used in it conform strictly to the latest A. O. U. list, but in which its author chooses to use the English instead of the classical names, of that list, should be stamped at once as unscientific and unquotable. Why isn't one set of names as accurate as the other? In the long run it has proved true that the vernacular names of the A. O. U. list have been more stable than the classical names. Scientific accuracy is, of course, absolutely necessary in any event, but are the arbitrary rules which have been laid down to measure the degree of accuracy wholly tenable?

During the absence of the editor, from July 28 to September 12, the indulgence of correspondents is asked. Letters addressed to Oberlin or to Birmingham will receive attention, probably after some little delay in many cases.

Field Notes

A HOUSE WREN DRIVEN FROM ITS NEST BY SPIDERS.—On the morning of June 12, 1910, I was greeted in my garden by the song of a House Wren. At first I thought it must be a straggling bird that had dropped in to glean a breakfast among my trees, but on the following morning it was singing as usual, and close by a Downy Woodpecker's stub that I had cut down and fastened in a tree, thinking thus to attract some bird to it as a nesting site. I soon discovered the female busily looking the trees over, and now and then inspecting the stub.

The next day I saw Mrs. House Wren carrying sticks into the hole and I felt quite satisfied in having a pair of House Wrens for tenants, this being the first pair that had ever nested in my place. About a week after I missed the delightful song, so started to investigate. Rapping on the stub no bird appeared, and I soon saw that the edges of the hole were alive with small spiders. I took the stub down and opened it, and found the nest swarming with these spiders. The birds in building the nest had used small twigs entirely and had thickly stuccoed them with the white egg sacs of a species of spider, that had hatched before the Wren had deposited her own eggs, and instead of making a home for her young, she had unwittingly gathered together a fine family of spiders and provided them with a well sheltered retreat.

South Auburn, Rhode Island. HARRY S. HATHAWAY.

The Village English Sparrow in the Grain-raising Region.—In the admirable article by Mr. Frank C. Gates, which appeared in the last Wilson Bulletin, in speaking of Havana, Illinois, there occurs the following: "The town, itself, is surprisingly free from weed patches of more than a very limited extent. For this reason, perhaps, the English sparrows, which are naturally attracted to the dwelling places of man, not finding sufficient food there, flock in groups of 25 to 150 and invade the wheat and clover fields. It was noticed repeatedly that whenever English sparrows invaded crop land it was virtually always in good-sized flocks." This calls forth two questions: Does the English sparrow ever eat weed seed to any appreciable extent when a grain diet is procurable? And is not the habit above described, one that is common to all English sparrows in the grain-raising belt?

Year after year my observations have been, that as soon as the kernels of growing grain are of edible size all the village sparrows, not held by nest duties, flock daily to the nearest grain fields; and that there is no cessation of their visits until the last shock of oats, rye, and barley has been taken to the threshing machine. Frequently, with the flocks may be seen young birds not yet able to feed themselves, to which their mothers bring food, sometimes feeding them with six or eight insertions of the bill, each insertion unquestionably showing the delivery of a kernel of grain. The toll upon the farmers' unharvested crops in the aggregate must be a vast amount. At this season, while driving along country roads, one sees the English sparrows that usually swarm about the farmers' pig-pens and chicken yards have deserted these resorts for a time and have betaken themselves to the grain fields.

This "avian rat" proves a pest to the poultry raiser, because of its pilfering the soft foods prepared for little chicks. Some people have dealt successfully with the thief by catching it in traps placed on the tops of the coops. For this purpose mouse-traps are used—the sort that consists of a wire spring fastened upon a small block of wood; merely one more device against the forces of the mighty.

National, Iowa. Althea R. Sherman.

Rare Birds at Canton, Ohio.—The spring migration of 1911 has been especially interesting here, because of the visitation of several rare species. These were, with one exception, water fowl, and were observed chiefly on Meyer's Lake, a sheet of water about three-quarters of a mile long and a quarter of a mile wide, situated two and one-half miles west of Canton.

The first of the rarer species to be noted was the Red-breasted Merganser, on April 2, when six individuals were seen, the males simplifying identification.

On the same date were also seen the Canvas-back and Old-squaw ducks, two individuals of each. Gunners also report the shooting of several Old-squaws. Dawson, in The Birds of Ohio, says this latter species is a rare winter visitor on Lake Erie, and casual in the interior; while the Red-breasted Merganser is stated to be a rare migrant. The Canvas-back, although less rare here than the others, is till entitled to mention.

April 9, and Osprey made its appearance here, staying in the vicinity of Meyer's Lake about a week. I had not met with an Osprey since January, 1904; long enough, certainly, to permit the species to be called rare.

Two Ring-billed Gulls were observed April 16, and one April 30. This species, Dawson states, is a rare migrant for the state elsewhere than on Lake Erie. Both observations were at close range under favorable conditions, and presented the peculiar condition of the first birds seen, being in full summer plumage, while the one observed a half-month later still bore some of the streakedness of head and rear neck of the winter plumage.

April 23, two flocks of Bonoparte Gulls were met with, twelve and seven individuals respectively. Several times in years past early cottagers at the lake have reported gulls which, from description, were possibly of this species, but so far as I know this is the first time the species has been definitely identified here.

The Red-throated Loon, two individuals were observed April 30, by an ornithological friend, Edward Jacot, and myself. This species, also, is reckoned a rare migrant for Ohio, especially in the interior.

Canton, Ohio. EDWARD D. KIMES.

BIRD NOTES FROM NORTHERN NEW JERSEY.—American Merganser (*Mergus americanus*). At Pompton Plains, Passaic County, on January 1st, 1911, I found a drake of this species on the Pompton River in behind a cluster of willows. The ice had thawed slightly the night before and quite a pool had formed and in this the bird was floating and bathing. This is rather a rare bird in this locality. On February 18th, two more (drake and duck) on the river about two hundred yards from where the one of January 1st was found.

Wood Duck (*Aix sponsa*). At Pompton Plains on March 26th I found a pair of these beautiful ducks floating on the river near

the Canal feeder. The male was full grown and had a crest which fell on its back as it rested on the water. The female was not fully grown and its plumage was very much ruffled up. The birds were quite fearless, as they allowed me to approach within fifty feet before rising to wing, and on rising just moved far enough off to be at a safe distance. On following them up stream they kept about 100 feet ahead of me for over a mile.

Killdeer (*Oxyechus vociferus*). At Pompton Plains on March 26th, four of these birds were found on the banks of the river searching the sand for food, which they were finding in great abundance. This bird is not as abundant of late as formerly and only found occasionally during the vernal migrations.

Bloomfield, N. J. LOUIS S. KOHLER.

THE CONNECTICUT WARBLER IN MAHONING CO., OHIO.—October 3, 1910, early in the morning, I started a Connecticut warbler from the rank encircling growth of a button-bush swamp. He flew to a twig and sat intently regarding me, while I just as intently examined him through the binoculars as he paused in the effulgence of the ascending sun. His yellow was not strong nor was the slaty gray of the throat and fore-breast, but the eyes were plainly encircled by that white ring which it is so important to look for and which distinguishes him from the mourning warbler.

A moment more and he was satisfied with his examination and dashed from sight like a tiny olive-backed or gray-cheeked thrush, to which, in expression of eye, attitude, and general behavior he bore no little resemblance. By no amount of beating about the bush or wading through the wet outer tangle of jewel-weed, spanish needle, fire weed and wild-rose bushes could he be forced to reveal himself again.

Dawson, in his Birds of Ohio, regards this as one of the rarest warblers of the state, and evidently not without reason.

This is the writer's third record for this bird during a period of eleven years' observation at this station. This was in all probability a male. The first record was a female secured from high tree-tops in September, 1906. While the second bird was observed in the low herbage of a hillside thicket May 28, 1909. This bird, like the one of last autumn, was examined carefully at short range and identified beyond any doubt.

It may be noted that so far I have never recorded the mourning warbler in autumn.

Ellsworth, Ohio. ERNEST WATERS VICKERS.

THE CHOCOLATE TOWHEE.—On October 25, 1910, after three weeks of fruitless effort I secured a bird in unique plumage, which I called the Chocolate Towhee.

Extremely shy and skulking in his ways, dodging in and out of the tops of the felled trees where the withered leaves clung thick, now in the brush-heaps or through the wood-side bramble-patches, he had led me a merry and discouraging race full oft; nor ventured to drop a single note that would lead to his identity. Nor was it my fortune to get one satisfying view of him through the glasses. So I began to fear that he might flit for the south some fine night, and leave me a sadder but no wiser man.

He was almost always alone, as though considered the black sheep of the family by his species, who did not appear to take kindly to his wild, furtive ways.

Nature was evidently in sportive mood when she made him, but as is often the case with freaks, he was no improvement on the beautiful colors or elegant color pattern of the towhee, as every bird-lover knows him in thicket and forest.

And the camera failed to give a definite conception of the odd mixing of dark brown and black in his plumage.

The idea seemed to have been to make an out and out chocolate bird of him, but the black persisted. Evidently a male bird, his measurements tallied so closely with those of other males of his species as to require no comment.

His only white feather was a single one on his throat just below the bill. Otherwise the white was replaced by dark brown or chestnut—a shade or two deeper than normally—so that the entire throat, breast and belly, including the vent and under-tail coverts, were all of one color without shading. This dark brown replaced the ordinary black on rump and tail-coverts, which, however, were marked or tipped with black. And the black of the back was irregularly splashed with brown. The crown and nape partook of the brown of the lower parts, extending around and uniting with it on the throat, but enclosing the black auriculars, lores, and line over the eye. The spot at the base of the primaries with the outer tail feathers, usually white, presented the palest brown in the plumage, being quite light. And there was brown where the primaries are normally edged with white, and likewise on the tertials. The greater coverts were also carefully edged with brown. The bill was dark horn instead of black as the male chewink.

Thus in this bird we have the untire underparts captured by the brown, likewise the head, nape and rump, with the black reduced to a square block on the back, on his wings and upper tail-feathers and the cheek spots. ERNEST W. VICKERS.

NOTES ON COURTSHIP OF JUNCOS.—These observations were all made in South Ravine, as it is locally called, near the Floyd Monument. On the eigth day of March the Junco males were seen driving the females. They were driving in and out among the bushes in a deep gully, the males uttering the characteristic Junco "tsip" repeatedly. On the nineteenth of March the males were again seen driving the females, but did not confine themselves to the bushes. The males uttered the characteristic Junco call repeatedly, and on this date I heard for the first time the love song of the Junco. It consisted of a low, simple song and a trill.

On March 26, at 10:30 a. m., in company with V. J. Hayes, I watched a pair of Juncos courting. The birds had been flying about abundantly all morning, and one pair was finally located in a small scrub oak. When they first attracted attention the male was perched on a small limb above and to the left of the female. He was bobbing and bowing his head to her; his wings were drooping and fluttered slightly at times. He uttered almost continuously a faint twittering song. The female was also bobbing and bowing to him and jumped from the branch she was perched on to another one to her left and then back again; this was repeated three times. The male kept up his bobbing and bowing, but turned on his perch so that he faced her all the time. After the third repetition of this the female hopped onto the same twig with the male. They stood facing each other, bills nearly touching, and bowed solemnly, both bobbing their heads at the same time. The male's wings were still drooping. Then the female hopped back to her original perch and the bowing and hopping from one perch to another continued for a short time. The female for some unknown reason flew away, and after about thirty second the male followed her. The time consumed in the whole performance was about two minutes.

Sioux City, Iowa, April 6, 1911. IRA GABRIELSON.

HORNED GREBE AT NEWARK, NEW JERSEY.—On April 23, 1911, a pair of Horned Grebes (*Colymbus auritus*) appeared on the lakes in Branch Brook Park, Newark, N. J. One of the birds was in the summer phase and the yellow feathers which form the horned crests were well developed and conspicuous. The other still retained much of its winter plumage and the crests had not appeared at all. Both birds were very tame, as they approached within seventy feet of the shore where a number of persons were congregated and watching the birds performing their expert dives and for their reappearances after these numerous submergings. There were a number of canoes about them and when these ap-

proached the birds would suddenly disappear and come up some distance off. This is rather a rare bird in this locality and this is the first time I have found them personally, although I have been told by competent observers that they occasionally appear from year to year during the vernal migrations in this park.

LOUIS S. KOHLER.

ADDITIONAL VERNACULAR NAME FOR THE FLICKER (*Colaptes auratus*).—The residents in several sections of Northern New Jersey speak of the Flicker as the "Woodcock." There is no confusion between this bird and the real Woodcock (*Philohela minor*), which they call "Mud Hen," as on numerous occasions I have asked them to show me the bird they term as the "Woodcock" and they have pointed out the Flicker each time.

The young of this bird in many instances fall prey to pot hunters, as they are prized by some of the lesser intelligent of the country folk and nearly all of the resident aliens as a table delicacy. The Game Commission has put forth their best efforts to stamp out this traffic, but in some of the isolated portions the practice is successfully carried on and heavy inroads are made upon their numbers each year.

Bloomfield, N. J. LOUIS S. KOHLER.

Educational Work

A COURSE IN BIRD STUDY.—For the last five summers there has been given a regular course in bird study at the marine biological laboratory of the Brooklyn Institute of Arts and Sciences. The laboratory is located at Cold Spring Harbor, Long Island, New York. It is thirty miles east of New York City, on the north side of Long Island, near Oyster Bay. Dr. Charles B. Davenport is director of the laboratory, and he is also director of the Station for experimental Evolution of the Carnegie Institution of Washington, which is located on adjacent grounds.

The surrounding country is quite diversified. In the immediate vicinity are sphagnum bogs, pine barrens, forest-clad hills, briery thickets, salt marshes, four beautiful fresh-water lakes, and an arm of Long Island Sound. This variety of habitat is conducive to a variety of birds. The Spotted Sandpiper, the Little Green Heron, and the Black-crowned Night Heron nest in the vicinity, and besides these, a great many land birds. During the six weeks, the bird class locates and identifies about three hundred nests, either in use or abandoned. This gives some notion of what a bird's paradise the region is.

The course, which consists of twenty lectures and daily excursions for field identification and study, is in charge of Mrs. Alice Hall Walter, who is well known to the bird students of this country. She is the efficient editor of the Audubon Societies School Department of BIRD-LORE, but perhaps she is best known as the co-author of "Wild Birds in City Parks," a very useful little book which has gone through several editions. In addition to the regular course, special problems for individual study, relating to the food and habits of birds, are given. During the session a beginner can get an introduction into ornithology, and can become more or less familiar with some sixty species of nesting birds.

The subjects of the lectures given are as follows: (1) Nesting Birds of Cold Spring Harbor; (2) *Skeleton; (3) Study of a Bird Family—Warblers (4) *Anatomy; (5) Study of a Bird Family—Sparrows; (6) *Feathers and Molt; (7) Other Passeriform Families; (8) Water and Shore Birds; (9) *The History of Bird Classification; (10) The Facts of Migration; (11) *Theories of Migration; (12) The Ancestry of Birds; (13) Distribution; (14) Distribution in America; (15) *The Bird's Place in Nature; (16) *The Economic Value of Birds; (17) Enemies and Protection of Birds; (18) Methods of Study in Schools; (19) *General Methods; (20) Literature. The lectures marked with an asterisk are given by Dr. H. E. Walter, Professor of Zoology in Brown University.

The course will be given again this summer beginning July 5th. Excursions to the American Museum of Natural History and to Bronx Park Zoological Garden will be arranged if desired.

G. C. F.

Publications Reviewed

The Home-Life of a Golden Eagle, Photographed and Described by H. B. Macpherson, with thirty-two mounted plates. Witherby & Co., London. Second revised edition.

In this brochure of forty-five pages the author has told in a simple manner of the difficulties attending a study of the home life of this "King of Birds." Only one whose heart was in the work could brave the difficulties and endure the almost impossible weather conditions which he endured. We wonder at his success in keeping his plates dry. The mounted photographs accompanying the descriptive matter make a collection of unique and enduring value, illustrating, as they do, nearly every phase of the home life of young and parents. Mr. Macpherson must find

his reward for the hardships endured and the discomforts which attended his work in the certain knowledge that he has here advanced our knowledge of this "King of Birds" in no small degree. L. J.

Our Great Travelers. Birds that fly from pole to pole and shun the darkness: Birds that make 2,500 miles in a single flight. By Wells W. Cooke, of the Biological Survey, U. S. Department of Agriculture. Reprinted from the National Geographic Magazine. April, 1911.

However, one might feel disposed to differ with Professor Cooke in regard to his expressed theories of the origin of bird migration as set forth in this article, he must agree that the twelve accompanying maps are of the greatest value to the student of bird movements. Professor Cooke's close studies of the migrations of the birds in compiling the reports of voluntary observers gathered by the Biological Survey, have made him our authority upon this subject. We are particularly glad to receive this latest contribution from his pen. L. J.

Methods of Attracting Birds. By Gilbert H. Trafton, Supervisor of Nature Study, Passaic, N. J. With illustrations. Published under the auspices of the National Audubon Societies. Houghton Mifflin Co. $1.25, *net*.

In this 171 page book we have almost a companion piece with Martin Hiesmann's book reviewed above Indeed, frequent reference is made to this book and some of the illustrations are taken from it. Mr. Trafton has gone more into detail as regards species, adapting everything to our somewhat different conditions. The book should prove of genuine value to teachers and to others who desire to entice the birds into the vicinity of their homes for more intimate study than the open field affords. It should also aid in the preservation from destruction of some of our weaker and less adaptable species. L. J.

How to Attract and Protect Wild Birds. By Martin Hiesmann, translated by Emma S. Buchheim, with an introduction by Her Grace the Duchess of Bedford. Second edition, with many revisions, with many illustrations. London. Witherby & Co. 1911.

This little book of a hundred pages is especially concerned with the birds of Germany, but it contains many hints which should prove useful in any region. The author follows a general discussion on bird protection in Europe and particularly in his own state with detailed descriptions of nesting places and nesting

boxes, and methods of feeding, and concludes with statements regarding the necessity of suppressing the enemies of birds and the necessity for coöperation if a rational protection of the birds is to be brought about. We are pleased to note that progress has been made both in Germany and in our own country in the direction of saving from extinction certain species which are not able to cope with changed conditions resultant from the coming of civilization into these countries. With the author of this little book we hope that the time is not far distant when other countries of the world will heartily join in the movement. L. J.

Significance of White Markings in Birds of the Order Passeriformes. By Henry Chester Tracy. University of California Publications in Zoology. Vol. 6, No. 13, pp. 285–312. December 28, 1910.

This vexed question is discussed by Mr. Tracy, not in the hope that he might be able to finally settle it, but rather "for the purpose of testing the validity of one of the earliest recognized categories of coloration, that of "Directive Markings," in a single order of birds." His discussion takes the form of a review of the discussion of Thayer, who regards white markings as "Concealing," since the two supposed functions might be regarded as antagonistic. Under the heading of "Intrinsic Factors in the Evolution of Color" he properly questions the presumption of Riddle that color patterns, particularly the white patterns, may be due to rhythms of blood pressure. Under the topic of "White Markings as Visual Clues," much evidence is submitted to prove that white markings do often serve as clues, even though they may, under certain conditions, also serve the purpose of concealing coloration. This is true of the birds of the forest as well as birds of the open. The paper is a welcome contribution to the study of this difficult problem. L. J.

Photography for Bird-Lovers. A practical guide. By Bentley Beetham, F.Z.S. With photographic plates. London: Witherby & Co.

After some pertinent remarks concerning the comparatively greater satisfaction resulting from this method of hunting birds as against the hunt with a gun, the author proceeds to give detailed directions for pursuing this "sport" in ten chapters. The author gives unmistakable evidence of being master of his subject in all its details. The directions for making pictures of birds,

their nests, and surroundings are specific and detailed, and much valuable information is given relative to the most successful methods of approaching birds in their natural habitats. The illustrations convey an idea of what the camera may catch and hold when in the hands of a person who knows how to use it and how to approach the birds. The book should prove of great value to those who desire to undertake this fascinating work. L. J.

Election of Members

The following nominations for membership in the Wilson Club have been approved by the Executive Committee. Members will therefore confer a favor in notifying the Secretary at once if objections to any of these are offered. In the absence of objections, candidates are considered duly elected, according to our Constitution:

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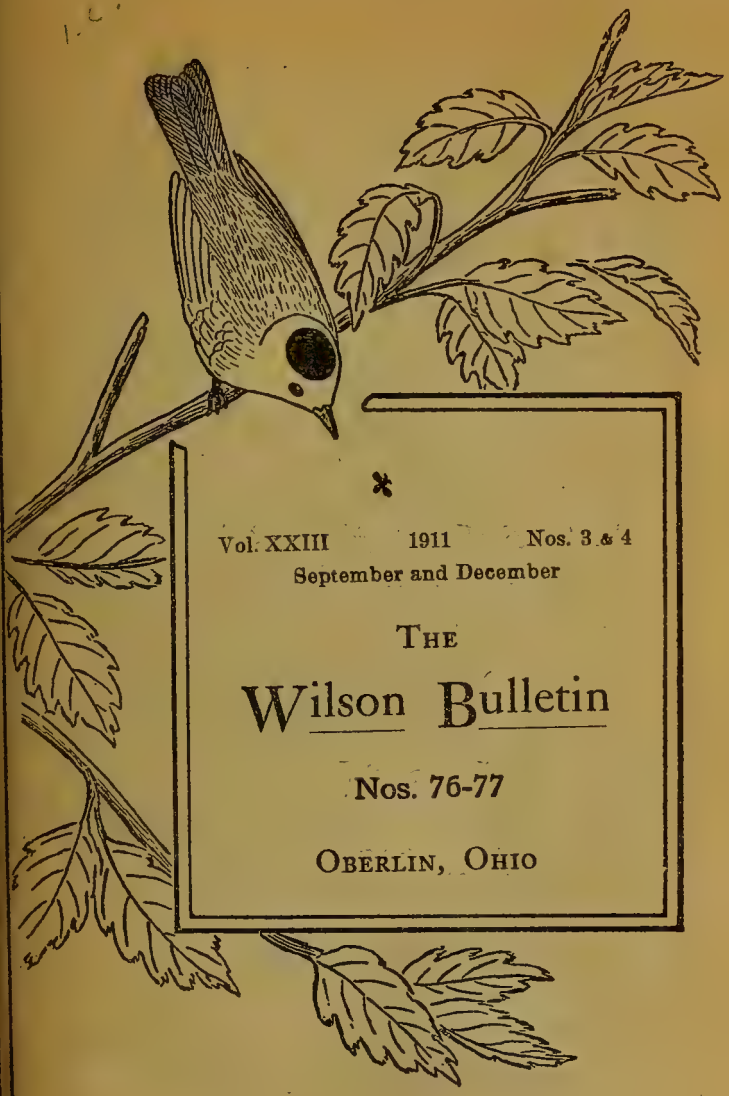

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THE WILSON BULLETIN

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Broad-winged Hawk (*Buteo platypterus*)
Adult female
(Photographed by Alfred C. Redfield)

A

MONOGRAPH

OF THE

Broad-winged Hawk

(***Buteo platypterus***)

BY

FRANK L. BURNS

With the co-operation of over one hundred American ornithologists, and the compilation of the world's literature.

BERWYN, PENNSYLVANIA
1911

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BROAD-WINGED HAWK
(Photo by Isaac E. Hess)

PREFACE.

Twenty-two years of personal observation and five years of close study of the literature of the subject of this paper, is perhaps none too long for the object in view, namely the inclusion in a single volume of the sum of our present knowledge of the life history of the species. In its ninety-eight years of history, the Broad-winged Hawk has always been considered rather rare, and for this, more than any other reason, perhaps, it has received a far greater amount of attention in a literary sense than the experience of the average observer would seem to warrant. With chastened spirit, one may trace many of the inaccuracies step by step back to the original statement. Even with the expectation of a vast amount of reiteration, and the possession of the saving sense of humor, the lack of originality of so many writers in reference to this species is all too painfully evident. I therefore point to the above in excuse for my frequent sacrifice of brevity in an honest endeavor to cite all statements in as nearly the exact words of the observer consistent to plain, comprehensive language. This has been a co-operative work, as well as a compilation of all the literature obtainable, and the credit has been given in the text wherever it is due. I am greatly indebted to the following persons for notes, specimens, excerpts, citations, photographs, or other assistance:

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Riley, Chas. C. Richards, Chas. H. Rogers, Alfred C. Redfield, F. B. Spaulding, Robert P. Sharples, and Norman A. Wood, for long continued aid and encouragement. I am also indebted to the Philadelphia Academy of Natural Sciences, Mercantile and Philadelphia Libraries for many of my references, and to Mr. Witmer Stone for use of his files of periodicals.

With a few exceptions, the method of treatment requires no further comment than the various sub-heads afford. Ridgway's "Nomenclature of Colors" is the standard for all color descriptions, and for obvious reasons the measurements of skins are given in millimetres following the English inch and hundredth thereof, but for the nest and egg measurements, the latter is employed exclusively because consistency requires uniformity throughout "Nidification," including distances from nest to ground. Knowing that the metric system is practically meaningless to the American oologist, it has been omitted. As far as the literature with its often contradictory reports can be relied upon, supplimented by the manuscript notes in which several state and numerous county records are for the first time recorded, both the past and present status of the species is indicated under the head of "Geographical Distribution," which should be used in conjunction with the "Bibliography." The importance of the latter, if measured by the time and trouble it took to secure the more than seven hundred titles, is not to be told in words. The writer assumes the responsibility for the correctness of all citations not otherwise accredited. Palpably erroneous records are here corrected and with all doubtful ones, are excluded from the body of the work. In conclusion I would beg that my studied omission of all personal titles which would involve tiresome repetition, should not be attributed to a lack of respect and civility.

FRANK L. BURNS.

Berwyn, Pa., Feb. 23, 1911.

Broad-winged Hawk

Buteo platypterus

Diagnosis of Genus.

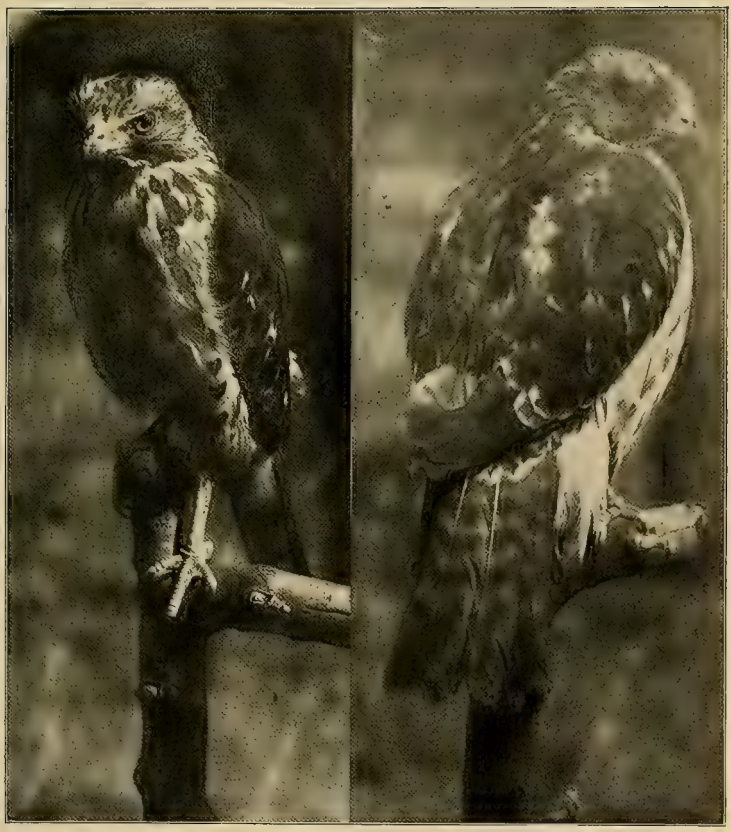
The *Buteos*, Buses or Buzzard-hawks, forming the central or typical genus of the Accipitrinæ, are found more or less numerously in all parts of the world except Australia. Difficult of difinition except by process of exclusion. Form robust and heavy, flight vigorous and sustained. Bill short, wide at base, intermediate between that of *Astur* and that of *Parabuteo*. Tarsi and toes moderate and robust, claws strong. Wings long and rather pointed, the third to the fifth quill longest, the first shorter than the eighth, outer three or four with inner webs emarginate. Tail moderate, rather wide, from slightly rounded to almost even. In the adult plumage the best specific characters may be found in the color and markings of the tail. The synonymy of the genus is as follows: *Buteo* Lacepede, Tableaux Ois., 1799. Type *Falco buteo* Linnæus, S. N. ed. 10, I, 1758, 90. *Buteo buteo* Licht. Nomencl. Mus. Busl. 1854, 3; European Buzzard.

Distinguishing Specific Characters.

Buteo platypterus may be readily distinguished from *Buteo swainsoni* and *B. albicaudatus*, by its smaller size, its shorter wings, the tips of its primaries reaching only to the middle of its tail, and by its fewer and comparatively distinct tail bars; from *B. brachyurus*, by its well marked underparts; and from all other species of North American *Buteos*, by its three primaries emarginated on the inner web.

Description and Measurements.

The juvenile or first year phase of *Buteo platypterus platypterus* may be easily recognized by the broad rufous or rusty edging of the upper parts, the longitudinal markings



Broad-winged Hawk (*Buteo platypterus*)
Juvenile female "Nip." April 5, 1908
(Photographed by Alfred C. Redfield)

of the lower parts, and the five to seven dark bars on the tail. The second year plumage by the transitional markings beneath, and of the four or five dark bars on the tail, the outer pair frequently as in the first year. In the adult there is considerable individual variation. In the United States the dark phase appears constant in the fall, and I have met with the gray-brown phase only in spring and early summer, and then considerably abraded as from wear and weather. Of the series of skins in the Academy of Natural Sciences of Philadelphia, a single adult taken at Brownsville, Texas, is the only spring example of the dark type, and even in this the mantle is grey; an immature taken about the same time from that locality is very pale. "In the adult the principal variation is in the continuity or distinctness of the anterior light band on the tail, and the extent and depth of the brown beneath. The first is characteristic of most specimens; it is broadest and most conspicuous, as well as less concealed by the coverts, in the females, and this appears to be the principal sexual difference." Ridgway. Excepting Cuban and perhaps Porto Rican specimens, there appears to be no consistent geographical variation. Two Florida birds differ not at all from the northern examples. Riley states that he has found no individuals corresponding to the gray-brown phase in a series of Cuban skins, but that the dark phase is hardly or not at all different from the eastern United States examples. The most constant differentiation between the Continental and the Lesser Antillean forms, aside from the size, appears to be in the number and width of the barring of the thighs, the latter forms averaging narrower.

An adult sexed as a female, taken at Bayòte, Santiago de Cuba on Feb. 2, 1906, has the upper plumage seal brown narrowly edged with russet, fading into sepia on wings and mantle; upper tail coverts seal brown, barred with white and narrowly tipped with wood brown. Underparts pale buff to white, banded with mars brown, confluent on breast; thighs and tibæ buff, banded with russet; under tail coverts

buff white with obovate spots of wood brown; lining of wings buff imperfectly banded with russet. Wing—10.50 (266). Tail—6.25 (159). Tarsus—2.16 (55). Middle claw—.69 (17). Hind claw—.78 (20). Bill from cere—.80 (20). Cere—.44 (11). A juvenile male taken at Holguin, Santiago, Cuba, Aug. 5, 1904, is not at all different from my local birds of the same age, except the dark upper plumage covers the white bases more perfectly, the abdomen is almost spotless and the thighs have heavier obovate markings. The measurements exceed that of my Salem, N. J., example of perhaps six weeks less growth, in all but tarsi and talons, which are less. The Cuban differs from the Continental bird in being slightly smaller, lacking the grayish phase of upper plumage and also seems to be comparatively heavier marked on thighs and lining of wings, our typical form frequently has the wing lining immaculate. On the other hand a specimen from Moose Factory, Hudson Bay, is as heavily marked on the thighs as the bird from San Diego, de los Banos, Cuba, in the National Museum; though as J. H. Riley points out to me, the latter seems to have fewer bars. I have not a large suite of skins to prove the difference between the mainland and island birds, between which no communication exists apparently. To justify recognition of a Cuban form the difference would have to be fairly constant. It must be remembered, however, that of the St. Vincent and Dominican birds examined by Clark and Verrill, upon which they based their forms, every one was taken in September and October, presumably at the time of the darkest phase; and the single adult from Antigua upon which Riley bases his form, was taken in May when pale, faded out specimens might reasonably be looked for in this species. Nevertheless all appear worthy of separation, as the Cuban and Porto Rican bird will eventually, and for which I offer *Buteo platypterus cubanensis*. Sub-spec. nov.

The average measurements of a series of 37 specimens taken on the mainland, follows:

	Length	Extent	Wing	Tail	Tarsus	Bill from cere	Cere	Middle Claws
15 Males—	15.41	34.45	10.48	6.44	2.46	.70	.43	.58
	(417)	(875)	(266)	(164)	(62)	(18)	(11)	(15)
22 Females—	15.98	35.57	10.94	6.46	2.56	.75	.46	.63
	(431)	(903)	(278)	(164)	(65)	(19)	(12)	(16)

Primary formula—4-3-5-2-6-7-8-9-10-1. Lores whitish with black bristles, the latter extending in a thin line on malar apex and under chin (mental apex); rectrices narrowly tipped with wood brown, in all specimens. About fifty per centum of the adult and second year birds examined personally, had yellow or straw-colored irides; but collectors of greater experience state that brown is the usual color in North America. In Cuba, Gundlach gives it as ochraceous with an inclination to dark gray; Riley notes the color on three eastern Cuban specimens is given as straw yellow with a brownish wash, while in two apparently fully adult birds shot by Palmer and himself in western Cuba, the irides were brown; and of two skins in my own collection taken in Santiago de Cuba, the adult is labeled "iris yellowish, brownish near pupil," juvenile "gray brown." The Porto Rico specimens show ochraceous-yellow, with a gray wash—Gundlach. United States of Columbia—male and female, brownish yellow—Sclater. Northeastern Peru, female, light chestnut brown—Taczanowski. Ecuador, light hazel brown, Berlepsch and Taczanowski; female, whitish, brownish in lower part—Taczanowski and Berlepsch. dirty white—Sclater. Rarely, both ovaries are developed in females, and as Bishop suggests, may account for some unusually large "males." The peculiar malformation of a supernumery toe has been noted once by Coale, and twice by Beebe.

Buteo platypterus antillarum "differs from the Cuban series principally in size, being smaller; in having the throat generally darker and the barring on the thighs averaging narrower; there are apparently no other differences."—Riley. According to Clark the irides of the St. Vincent bird are yellowish-white in all stages, and it is given by Lister as yellow.

Buteo platypterus rivierei.—"The series from Dominica are darker than specimens from St. Vincent, more sooty above, more heavily marked below, and with the bars darker. In size there is very little difference between St. Vincent and Dominica specimens. This is probably a fairly well-marked insular form, depending upon its darker coloration for recognition."—Riley. The irides "are white or pale straw at all ages and in both sexes"—Verrill. Ober, however, gives it as umber—Lawrence.

Of *Buteo platypterus insulicola* the describer states: "The adult is much lighter and smaller than *B. p. antillarum*, and the bars below are narrower and less sharply defined. It is certainly a well-marked insular race, not coming into close contact with any of its relatives on the north or south."—Riley.

BUTEO PLATYPTERUS PLATYPTERUS.

Natal Down, Young, One Day Old.—Well covered with the palest possible yellowish-white down, bill blue-black, cere very pale yellow, edge of mouth, feet and tarsi flesh color, irides blue-black. Examples: Berwyn, Pa., June 12, 1901; Daylesford, Pa., June 3, 1906.

Juvenile First Year, Male.—Upper parts deep rich brown, almost black; head, hind neck and back edged with rufous, the basal portion being pure white; primaries and secondaries fading on the inner webs to white and barred with deep brown, tipped with gray; tail clove brown fading on inner webs to white, with six bars of deep brown about one-quarter of an inch wide, except terminal bar, which is from half to three-quarters of an inch wide and narrowly tipped with ashy white; upper tail coverts white tinged with rufous on outer vane and imperfectly barred with deep brown. Beneath impure cream buff with guttate spots of fuscous clustering on breast, sides and flanks; abdomen and under tail coverts immaculate; tibiæ vermiculate near body, acicular near heel; throat with a few pencilings of deep brown; incipient malar stripe dusky brown; under primary coverts

white faintly stained with buff and spotted irregularly with deep brown; lining of wings cream-buff unspotted with the exception of bend of wing—deep brown arcular spots. Irides pearl gray. Bill and claws black. Feet and tarsi yellow ochre.

Length 14.75 (375). Wing 9.05 (230). Spread 33.00 (838). Tail 6.25 (158). Tarsus 2.51 (64; middle claw .54 (14); hind claw .06 (17). Bill from cere .66 (17; nostril to tip .63 (16). Cere .38 (10). Weight 9½ oz. About two months old. No. 889, coll. F. L. B., Salem, N. J., Aug. 9, 1905.

Juvenile, First Year Female.—Upper part rich clove brown; outer webs of primaries, secondaries and rectrices barred with black or very deep brown, inner vanes fading to white and barred with deep brown; wing coverts, greater and middle, edged with wood brown; rectrices fading to pale cream on outer webs, and nine dark bars; upper tail coverts broken bars of clove brown on white of outer webs; hind head narrowly tipped with cream and three-quarters basally; sides of head pale cream tipped with clove brown; malar clove brown; chin pale cream with center penciling of brown; breast, sides, abdomen and under tail coverts white, posteriorally immaculate, anteriorally broken ovate spots of olive; tibiæ pale wood brown, handsomely marked with cordate spots; lining of wings pale wood brown with olive markings, laneolate and acicular in form; axillars broken spots of olive; under primary coverts pale cream white, spotted with olive. Irides wood brown. Beak and talons black, under mandible fading to gray posteriorally. Cere, feet and tarsi yellow ochre.

Length 14.70 (373). Wing 9.25 (235). Spread 33.25 (846) broken and worn at tips. Tail 6.10 (155). Tarsus 2.71 (69). Middle claw .54 (14); hind claw .75 (19). Bill from cere .73 (19); from nostril .73 (19). Cere .51 (13). Weight 1lb. 1 oz. 8½ months old. Berwyn, Pa., Feb. 16, 1907 (captive). Coll. F. L. B.

This specimen was raised in a large cage in the open air and lost by abrasion the rufous edging to the feathers of the upper plumage. It is in all respects a bird of the year, no winter moult having occurred.

First Nuptial, Second Year Male.—Upper parts deep vandyke brown, almost black, fading to hair brown on scapulars, and confined to narrow bars and edgings on primaries, secondaries and tertials, the bars often ending in russet on the inner webs which are two-thirds white except at the tips; hind neck basal three-quarters white; sides of neck, middle of the back, scapulars, greater and middle wing coverts edged with mars brown; upper tail coverts rich vandyke tipped and barred with soiled white or else hair brown; tail hair brown fading on inner vanes to white, crossed by four bands of deep vandyke brown. Beneath soiled cream-buff with lanceolate markings on throat, and large imperfect cordate spots on breast, sides and abdomen, confluent on sides of breast, of pure vandyke and burnt umber; narrow malar stripes of clove brown; under tail coverts of soiled white with narrow spots, mainly sagittate, of clove brown; lining of wings cream. Irides pearl gray. Beak and talons black. Feet and tarsi yellow ochre. Cere yellow ochre.

Length 14.50 (365). Wing 9.75 (247). Tail 6.25 (158). Tarsus 2.58 (65). Middle claw .56 (14 ; hind claw .66 (17). Bill from cere .65 (17) ; from nostril .50 (17). Cere .41 (.10). Weight 13 oz. 15½ months old. Berwyn, Pa., Sept. 26, 1908. No. 925, coll. F. L. B.

First Nuptial, Second Year, Female.—Upper parts fuscous, narrowly tipped with rufous; basil portion of nape pure white, sides of head with lateral streaks of ashy and rufous; exposed parts of primaries deeper fuscous or vandyke brown, indistinctly barred with ashy on the outer web and the fuscous forming bars on the white inner web from the notches to insertion; secondaries and coverts fuscous, fading gradually toward the edges to ashy; upper tail coverts tipped and banded with white; tail vandyke brown, with four bands of grey, white on inner web; the last band indistinct and fading terminally into white, the second one-half to three-quarters of an inch wide, and the basal about one-quarter of an inch wide and partly concealed by the coverts; the outer

pair of rectrices similar to that of young, indistinctly crossed with seven ashy bars; inconspicuous mustache of fuscous running from rictus across cheek; underparts white; chin, throat and breast suffused with pale buff and streaked with brownish-rufous, becoming oval on breast, and cordate and transverse on flanks; under tail coverts white, unspotted; lining of wing delicate cream-white with dusky acicular markings; under primary coverts white with cordate spots of fuscous; tibiæ buffy-white with cordate spots of rufous. Irides Naples yellow, obscured on the inner rim by a semi-transparent raw umber stain. Bill—upper mandible-black, fading to a plumbeous about the base; and lower mandible plumbeous and intensifying to dull black from anterior half.

Claws black. Feet and tarsi yellow ochre. Length 15.60 (396). Wing 10.60 (269). Spread 34.55 (877). Tail 6.10 (155). Tarsus 2.64 (67). Middle claw .73 (18). Bill .77 (21); nostril to tip .65 (16). Cere .33 (8). Weight 1lb. 3½ oz. No. 883, coll. F. L. B., Berwyn, Pa., Apr. 27, 1906.

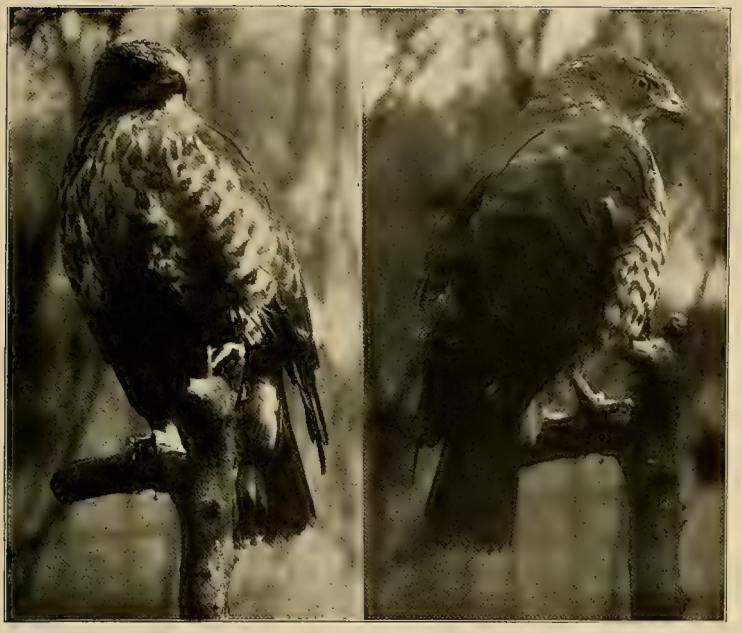
Another example—Upper parts light olive, deeper brown on back, primaries and secondaries broadly tipped and narrowly barred, and wing coverts centered with same, the last edged with broccoli brown; back of neck edged with cinnamon; tail broccoli brown fading into pearl gray on inner vane and crossed by three broad bands of deep brown, narrowly tipped with pearl gray, outer pair broken in numerous barring as in first year bird. Beneath white, broken by transverse markings on the breast, of dull rufous, shafts deeper; throat yellowish-white, streaked with burnt umber; malar deep brown; tibiæ wood brown barred with rufous; under primary coverts white barred with olive; lining of wing cream-buff, occasionally streaked with tawny olive. Irides yellow. No. 64, coll. F. L. B. Berwyn, Pa., May 11, 1888.

Adult Female, Dark Phase.—Upper plumage deep rich vandyke brown almost black, fading to wood brown in narrow edging and mottling on wings and mantle, narrow edging of russet or mars brown between shoulders, mantle, coverts, sides of neck, nape and sides of head, growing almost

wood brown anteriorally; inner webs of quill feathers of wings above emargination wood brown, fading to pure white and imperfectly barred with deeper brown; tail coverts pure white barred with clove brown; broad malar and narrow streaks at the middle of the throat clove brown. Beneath soiled white, from chin to and including breast, and cream-buff to tail; wood on tibæ, spotted with prout's brown in hour glass markings on breast almost confluent, cordate below less frequent; under tail coverts unspotted; chin and throat have a few acicular markings; lining of wings, axillaries and under primary coverts buff with sagittate spots in mars brown except last, which are dusky. Beak and talons black. Cere, feet and tarsi yellow ochre. Irides yellow.

Length 16.00 (406). Spread 35.50 (901). Wing 10.90 (276). Tail 7.00 (177). Tarsus 2.83 (71). Middle claw. .65 (16); hind claw .70 (17). Bill from cere .76 (19); bill from nostril .70 (17). Cere .52 (13). Third season. No. 349, coll. F. L. B., Newton, Delaware Co., Pa., Sept. 1, 1892.

Adult Male, Gray-brown Phase.—Type, Academy of Natural Sciences, Philadelphia, No. 1551. (Orig. No. 407). Philadelphia, May 6, 1812. Collected by Alexander Wilson. "Length fourteen inches, extent thirty-three inches; bill black, blue near base, slightly toothed; cere and corners of the mouth yellow; irides bright amber; frontlet and lores white from the mouth backwards runs a streak of blackish brown; upper parts dark brown, the plumage tipped, and the head streaked with whitish; almost all the feathers above are spotted or barred with white; but this is not seen unless they be separated by the hand; head large, broad and flat; cere very broad, the nostril also large; tail short, the exterior and interior feathers somewhat the shortest, the others rather longer, of a full black, and crossed with two bars of white, tipped also slightly with whitish; tail coverts spotted with white; wings dusky brown, indistinctly barred with black; greater part of the inner vanes snowy; lesser coverts, and upper part of the back tipped and streaked with bright ferruginous; the bars of the back are very distant on the lower side of



Broad-winged Hawk (*Buteo platypterus*)
Adult female "Nip." Nov. 21, 1909
(Photo by Alfred C. Redfield)

the wing; lining of the wing brownish white, beautifully marked with small arrowheads of brown; chin white, surrounded by streaks of black; breast and sides elegantly spotted with large arrow-heads of brown, centered with pale brown; belly and vent, like the breast, white, but more thinly marked with pointed spots of brown; femur brownish white, thickly marked with small touches of brown and white; vent white; legs very stout, feet coarsely scaled, both of a dirty orange yellow; claws semi-circular, strong and very sharp, hind one considerably the longest." Alexander Wilson, American Ornithology, VI; 1812, p. 93.

Adult Female, Gray-brown Phase.—Upper parts wood brown, with seal brown centers, especially on head, neck and middle of back; primary secondary and tertial bars and tips seal brown, save a narrow border on tips which shows a very light wood brown conspicuously, also on the inner webs which fades to pure white; basal three-quarters of nape white as usual, and feathers of sides and neck edged narrowly with russet; tail gray with three broad bands of deep seal brown, and upper tail coverts tipped and barred with white; broad malar, and lanceolate streaks of deep brown on chin and throat. Below white, with the sides, flanks and abdomen banded with brownish-gray; breast and jugulum except upon center, same color almost solid and with shafts much deeper; under tail coverts unspotted, tibæ lighter cordate in wood brown; under wing coverts, axillars and primary coverts ivory-white with a few sagittate spots of clay color. Irides straw color. Bill and talons black. Cere, feet and tarsi yellow ochre.

Length 15.75 (400). Spread 35.75 (907). Wing 10.30 (261). Tail 6.75 (171). Tarsus 2.52 (62). Middle claw .67 (17); hind claw .67 (17) Bill from cere .78 (20); from nostril .73 (18). Cere .43 (11). Aged three or more years. No. 547, coll. F. L. B., Bradford Hills, Chester Co., Pa., Apr. 16, 1895.

MELANISM.—The melanistic phase is not wanting, though with one possible exception, all examples have appeared in Iowa, Minnesota and Manitoba. On Feb. 23, 1908, Mr. J. H.

Riley saw a very dark bird pass almost directly overhead at Fall Church, Va. He informs me that he had a fairly good look at it, and that it had some white on the breast, but appeared to be very dark otherwise; whether upon being shot it would be as dark as it appeared, it would be hard to say. Worthen mentions one specimen from Minnesota, of a solid dark umber, showing dark bars on tail and primaries; and Seton another collected by A. Calder, Apr., 1907, Winnipeg, Manitoba, sex not stated; fortunately, however, I am able to give descriptions of perfect specimens of both male and female:

Male.—Portage la Prairie, Mana., May 30, 1900; coll. Geo. E. Atkinson. It was found in company with another in normal plumage which was not collected. This specimen was in excellent plumage, entirely sooty black and very dark brownish, except the light tail bars. The entire head, above and below, is as dark as the breast. Length 16.00 (406). Wing 11.00 (279). Tail 6.50 (165). Atkinson ms.

Female.—Crystal Lake, Hancock Co., Iowa, May 3, 1883, No. 107,427 U. S. National Museum. Collected by J. W. Preston. "Plumage of head, neck and body, entirely continuous dark sooty brown, without the faintest indication of markings even on the lower tail-coverts or lining of wing; back darker, with a chalky cast in certain lights. Wings similar to the general plumage, but somewhat lighter brown, on account of paler, but not well defined, borders of feathers; secondaries lighter brown than coverts, without a trace of markings except near the end, when crossed by a broad dusky subterminal band and very narrow paler terminal margin; primaries uniform dusky brown on outer webs, growing gradually blackish terminally, inner webs of the three outer quills chiefly white anterior to their margination (the portion near the shaft brownish), the white crossed by several very distinct but irregular bands of blackish; inner webs of remaining primaries and also of secondaries brown, with a greater or less number (according to the length of the feather) of dusky bands, the webs mottled with whitish

along the edge. Upper tail-coverts with concealed pale grayish brown, crossed at about 1.50 in. from the end by a broad band (about 1 in. wide) of brownish-gray, becoming white on the edges of inner webs, and approaching white on the anterior portion of the band on the middle rectrices; another much narrower and much less distinct dull grayish band crosses the tail about 4.75 in. from the tip, the portion on inner webs more or less whitish on some of the feathers, but on none extending clearly to the edge of the webs; extreme base of the tail light scoty grayish. Feathers of the head, neck and body, above and below, sooty grayish beneath the surface, the extreme base even scarcely approaching white; the feathers of the entire occiput, however, abruptly snow-white for about the basal half. Forehead entirely sooty blackish, but anterior portion of the lores grayish white, finely streaked with black. Wing 11.50 (291). Wing form. 3, 4-5-2-6-7-8-9-1, 10; outer three primaries abruptly and deeply emarginated on inner webs; tail 7.00 (178); culmen. 80 (20); tarsus 2.40 (61); middle toe 1.40 (36). Mr. Preston says: 'This is the third specimen that I have seen, 12 years since my attention was called to a peculiar little black hawk flying with a number of *B. pennsylvanicus*. In the spring of 1884 I came very near securing another which was in migration with others of the species. The present example was shot by myself in a small oak grove. A number of Broadwings were sheltered in the woods at the time, as a cold storm prevailed. Ova much enlarged and iris red.' Ridgway.

BUTEO PLATYPTERUS ANTILLARUM.

"Type—From Chateaubelair, St. Vincent (British West Indies), Sept. 24, 1903, No. 12,825, male adult, coll. E. A. and O. Bangs. Characters—Somewhat similar to *Buteo platypterus* Vieill., but smaller and more rufous, the rufous edgings to the feathers above wider, the underparts more rufous, and the thighs buff, more thickly barred than *B. platypterus*. In the young the ground color below is buffy-white, becoming darker on the abdomen and thighs. Iris

yellowish white in all stages, not brown as in *B. platypterus*. Cere yellow. Feet orange yellow. Bill dark slaty.

Male—Wing, (9.45-9.77) 240-248; Tail (5.99-6.07) 152-154; Tarsus (2.09-2.17) 53-55. Female—Wing, (9.97-10.71) 253-272; Tail (5.95-6.50) 151-165; Tarsus (2.09-2.17) 53-55." Austin H. Clark, Proc. Biol. Soc. Wash., XVIII, Feb. 21, 1905, 62.

Later a more comprehensive description is given: "Above brown, the feathers white at the base and margined with rufous to the tips, the white bases showing through the nape, and giving that region a mottled appearance. Wing coverts margined all around with rufous, lores whitish; head brown all around, the feathers margined with rufous, being darkest at base of bill and under eyes. Throat light buff, more heavily toward abdomen, which is mainly light buff, barred with rufous brown. Under tail coverts light buff. Thighs buff, barred with many transverse lines of rufous. Under wing coverts buff like thighs, many of the feathers having small black central streaks. Upper tail coverts tipped with white. Tail brown, tipped with light grayish brown, with white at the extremity, crossed by two bands and an indicated third band of light grayish brown, becoming white on the inner webs of the feathers. Iris yellowish-white; cere yellow; feet orange; bill dark slaty." Clark, Proc. Boston Soc. Nat. Hist., XXXII, No. 7, Oct. 1905, 241.

BUTEO PLATYPTERUS RIVIEREI.

Dominica, West Indies. Type specimens in the collection of Dr. L. B. Bishop, New Haven, Ct. Original description: "Much smaller, darker, and with relatively heavier feet and legs than any other form. Adults: Above deep umber or dusky brown or even blackish. Back, scapulars and upper wing coverts always edged with deep rusty or rufous. Primaries plain dusky on outer webs pure white with no indication of darker bars. Under wing coverts rich rusty or orchreous with narrow median lines and subterminal bars of dusky. Upper tail coverts broadly tipped with white. Tail feathers dark grayish or dusky, crossed below by about six white,

and above by three or four brownish gray, bands. Occiput, forehead, crown and neck, deep umber brown; each feather edged with dark rufous and often with medial streaks of the same color. Lower parts whitish, becoming rusty on flanks, sides and lower tail coverts and rich rufous on chest, thickly and heavily marked with hour-glass shaped patches of rich ferruginous or sienna brown; the markings becoming confluent on chest and sides and forming narrow distinct bars on flanks and thighs. Lower neck, throat, loral region and sides of head, deep rufous brown with indistinct narrow longitudinal lines of darker umber brown. Chin pale rufous, contrasting sharply with dark dusky mustache. Young: Above, much as in adult. Below, ochreous or pale rufous; lighter posteriorly and more heavily marked with tear-shaped umber brown spots most numerous on chest. Eyes white or pale straw at all ages and in both sexes. Bill bluish horn color; cere yellowish or sap green. Feet and legs greenish-yellow.

Length 13. to 16. (330 to 406), Wing 8.50 to 9.50 (216 to 241); Tail 4.72 to 5.50 (125 to 140). Culmen .90 to 1.10 (23 to 41). Tarsus 1.20 to 1.50 (30 to 38). Middle toe 1.25 to 1.60 (32 to 40)." A Hyatt Verrill, Addition to the Avi-fauna of Dominica, West Indies [Oct. 1905, unpaged].

Buteo platypterus insulicola.

"Type, U. S. National Museum, No. 119,349, male adult, Antigua, British West Indies, May 29, 1890. Collected by Cyrus S. Winch. Frontal apex, lores, and a narrow line above and below eye whitish, with some stiff black bristles; top of head and auriculars grayish brown, with darker shaft streaks; rictal streak darker; occiput white, with the feathers tipped rather broadly with sooty brown; back and rump blackish brown, the feathers of the upper back barred at their bases with white, and slightly edged with wood brown, upper tail-coverts black barred with white; tail black, tipped rather narrowly with dark drab and crossed by two rather wide white bars and an indication of a third that does not

reach the shaft on individual feathers; scapulars color of the back, strongly barred with white for about two-thirds of their length, basally; primaries dull black on the outer web and tip, white on the inner web as far as the emargination on the outer feathers, but not reaching the shaft except at the base, the black increasing in area from the outer feathers inward and turning to dark brown at the base and tip, leaving a large subterminal black band, a small black spot appearing on the inner web on the edge of the white of the second outer feather, increasing in number and intensity inwards on the other primaries, where they become interrupted bars not reaching entirely across the white to the inner web, however; secondaries and tertials grayish brown with a dull black subterminal band, the inner webs of the outer and the inner webs and bases of the inner feathers white, barred with dark brown; wing-coverts grayish brown; primary coverts dull blackish brown, irregularly barred with white on basal two-thirds of inner webs, the white extending to only webs at extreme base; lining of wing cream buff; sparsely spotted with small cinnamon spots; axillaries creamy white, with rather narrow bars of mars brown along the shaft; chin and throat white, with narrow dark brownish streakings; rest of underparts white, barred spotted or streaked comparatively lightly with mars brown, the streakings barring heavier on the chest, decreasing on the abdomen, and ceasing entirely on the under tail-coverts; thighs narrowly barred with mars brown.

Wing (8.94) 227; tail (5.63) 143; culmen, from cere (.71) 18; tarsus, (2.20) 56; middle toe, (1.10) 28.5 mm. J. H. Riley, Auk, XXV, July, 1908, pp. 273-274.

Synonymy.

Wilson being the first to properly figure and describe this species, in 1812 bestowed upon it the name of *Falco pennsylvanicus* (Penn's Woods Falcon); but as he had previously so-named his Slate-colored Hawk, an immature *Accipiter velox*, and did not live to correct his error, it of course resulted

in confusion. In 1824 Bonaparte proposed *F. Wilsonii* (in honor of Alexander Wilson), but immediately announced in a footnote that Ord, who was Wilson's editor and immediate successor, had informed him of his intention to substitute *F. latissimus* (broadest) for *F. pennsylvanicus* in the 1824 reprint of Wilson's American Ornithology; and which was done accordingly. Bonaparte did not formally withdraw his own appellation, but merely added that Ord's name must be adopted, if not pre-occupied. Indeed, Ord had already made use of this name in a list appearing in Guthries' Geography, 1815, but unfortunately neglected to add description or refer to Wilson's figure or description. In the 1828 edition of Wilson, Ord is made the authority for the statement that he was responsible for the change in the reprint, and the declaration that should *F. pennsylvanicus* Slate-colored Hawk and *F. velox* Sharp-shinned Hawk prove to be the same species, the former name should be retained for the Broad-winged Hawk and *F. velox* for the Slate-colored or Sharp-shinned Hawk. In 1829, Griffith and Pidgeon, and in 1840, Brewer, quoted *F. latissimus* Ord; demonstrating the fact that no confusion existed at the time over the authority of the name. Audubon found the Slate-colored and Sharp-shinned Hawks identical, immature and adult in different plumages; and *velox* being the first named as well as the adult, that name was retained; and *pennsylvanicus* now a synonym, fell in disuse in this instance, but was revived and came into general use for the Broad-winged Hawk. However, trusting to the failing memory of the aged Ord, Cassin in 1854 stated that Wilson himself had corrected the name to *latissimus* in the later copies of the original edition. The very existence of the reprint of 1824, which retained the original date, was forgotten; and when Sharp revived *Buteo latissimus* in 1874 in accordance with Cassin's erroneous conclusions, the editors of the *Ibis* protested against the change, based as it was upon strained application of the laws of priority, after remaining practically unchallenged for over sixty years; yet the law "once a synonym always a synonym" relegated *pennsylvan-*

icus to the ornithological limbo, and *latissimus* came to its own only to give way at last to the long ignored *platypterus* of Vieillot, in 1901, when Faxon reasserted Ord's editorship and the existence of the 1824 edition or reprint of Wilson's American Ornithology; and as he states, both Ord's and Bonaparte's names are anticipated by the *Sparvius platypterus* of Vieillot, 1823! Riley and Richmond burrowing through musty volumes of ancient ornithological lore, have recently discovered in the *Falco fuscus* of Miller, 1777, an immature *Buteo*, probably *B. platypterus;* considered a fairly good representation for an old plate, "though the tail is too fulvous and the dark brown subterminal band is much too narrow." Here again, the Broad-wing and the Sharp-shin clash, for until recently, *fuscus*, based primarily upon this drawing, was the generally accepted specific name for this *Accipiter*.

"? *Falco fuscus* Miller, Various Subjects Nat. Hist., Pt. 3, 1777, pl. 18.—Shaw, Cimelia Physica, 1796, 35, pl. 18. ?[*Falco*] *fuscus* Gmelin, Syst. Nat., I, i, 1788, 280 (based on Miller pl. 18; not of Gmelin 271). Latham, Index Ornith., I, 1790, 43, No. 103 (same basis). ?*F*[*alco*] *cinerascens* Bechstein, Latham's allgemeine, Uebersicht der Vogel, IV, 1811, 36 (based on Lathan, Index, I, 43, No. 103)."

Wilson suggests, Am. Orn. IV, 1812 92; and Coues, Cent. Dict. I, 1891, 743; considers the probability of the Buzzardet *Falco albidus* Pennant Arctic Zool., II, 1785, N. 109; being identical with this species.

Buteo platypterus platypterus (Vieillot).

Falco pennsylvanicus Wilson, Am. Orn., VI, 1812, p. 92, pl. 54, fig. 1 (type in coll. Philadelphia Acad. Nat. Sci.; not of Wilson *t. c.* 13, pl. 46, f. 1).—Latham, Gen. Hist. Bds., I, 1821, 263.—Bonaparte, Sp. Comp. D. Orn., 1827, 19; Ann. Lyc. Nat. Hist. N. Y., II, 1828, 29; Oken's Isis, XXV, 1832, 1137.—Audubon, Bds. Am. I, 1828, pl. XCI; Orn. Biog., I, 1832, 461; *Ibid.* V, 1839, 377.—Jardine, Wilson's Am. Orn., II, 1832, 298.—Nuttall, Manuel, I, 1832, 105.—Temminck, Index de oseaux, 6, 1836, 5; Nouv. Reg., I, 1837.—Magiet, Cat. Magn., 1846, 2.—Chartrouse, Cat. de Ois., 1856, 5.—Holmes, Rep. Conn. Patents, 1856, Agri. (1857), 113.—Samuels, Bds. N. Eng., 1870, 40; Our N. and E. Bds., 1883, 40.

Falco pensylvanicus Bonaparte, Cat. Bds. U. S. 1827, 10.

[*Falco*] *pennsylvanicus* Michener, Hist. Chester Co., Pa., 1881, 441.

Falco Pennsylvanicus Swainson and Richardson, Fauna-Borealis, II, 1831, 66.—Jameson, Wilson's Am. Orn., I, 1831, 65.—Baker, Am. Orn. Index, 1835, 10.—Kirtland, Rep. Ohio Geog. Sur., 1838, 161, 178.—Brewer, Syn. Bds., 1840, 684.

F[*alco*] *Pennsylvanicus* Griffieth and Pidgeon, Class Aves, 1829.—Griffeth, Animal Kingdom, VI, 1829, 49.—Linsley, Am. Jour. Sci and Arts, XLIV, 1843, 252.

S[*parvius*] *platypterus* Vieillot, Ency. Meth., III, 1823, 1273.

F[*alco*] *Wilsonii* Bonaparte, Jour. Acad. Nat. Sci. Phila., III, Apr. 1824, 348.

Falco latissimus Ord, Wilson's Am. Orn., VI, 1812 (1824 reprint), 92.—Bonaparte, Am. Lyc. Nat. Hist. N. Y., II, 1828, 29

F[*alco*] *latissimus* Ord, N. A. Zool., 1815, 315; Wilson's Am. Orn., II, 1828, 92 (footnote).—Bonaparte, Jour. Acad. Nat. Sci. Phila., III, 1824, 348 (footnote).

Astur pennsylvanicus Bonaparte, Oss. Cuvier Reg. An., ed. 2, I, 1829, 332.—Richardson, Rep. Brit. Ass. Adv. Sci., 1836 (1837), 168.—Sundevall, Dis. Acc. Hem., 1874, 24.

Astur ? latissimus Jardine, Wilson's Am. Orn., II, 1832, 294.

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Vernacular Names.

Broad-winged Hawk. "Its great breadth of wing, or width of the secondaries, and also of its head and body, when compared with its length, struck me as peculiarities," (Wilson).

Broad-winged Buzzard, (Coues).

Broad-winged Falcon, (Latham).

Broad-wing, (Of many writers).

Broad-winged Hawk, (Vieillot).

Broad-billed, Brown-winged and Road-winged Hawk—doubtless typographical errors (minor oological periodicals).

Chicken Hawk. In common with the Marsh, Red-tailed, Red-shouldered, Rough-legged and Cooper's Hawks. (Coues, and Prentiss, Surface, Widmann, and others).

Falcon de Monte, Cuba, (Brewer).

Gahilian, Minea, Sierra Nevada of Santa Marta, Venezuela, (Slavin and Godman).

Hen Hawk, Hohawk Valley, N. Y. (Willard); Maryland;. The three *Buteos*, (Kirkwood); Massachusetts, (Maynard).

Halcon pinto, Mexico, (Ferrari-Perez).

L'Autour de Pennsylvania, Canada, (Le Moine).

La Buse de Pennsylvania, Quebec, (Dionne).

Pennsylvanian Buzzard, (Sharp).

Buteo platypterus antillarum.

Antillean Chicken Hawk, St. Vincent, (Clark).

Broad-winged Hawk, (Of earlier writers).

Chicken Hawk, St. Vincent. "The name by which this bird is

known throughout the island led me to suppose that it was an enemy to chickens. I never observed it molesting the poultry," (Lister); St. Vincent, (Ober); Grenada, (Wells).

Gree gree, Grenada, (Wells).

Buteo platypterus rivierei.

Broad-winged Hawk. This is a book name never used by the people in general, though very appropriate and sanctioned by almost a century's usage in literature.

Mal fini, St. Marie, Indian Country, Dominica. "This bird courses above the valley, uttering its cry of '*Mal fini, fini,*'" (Ober).

Malfeenee, Dominica, (Verrill).

Rivieri's Hawk, Dominica. In honor of Dr. Rivieri (Verrill).

Geographical Distribution.

The summer range of *Buteo platypterus platypterus* extends from Cape Breton Island to central Alberta (northernmost records—Moose Factory, southern extremity of Hudson bay, Ontario; and 12 miles west of Ste. Anne, Alberta); south to Florida and central Texas. The western limits correspond substantially to the western limits of the humid province in the United States. Resident in Cuba and Porto Rico. Local throughout its range. Reported more or less abundant as a breeder in northwestern Florida, Adirondack mountains, Connecticut valley, Umbagog lake region, New Brunswick, interior of Quebec, Muskoka and Parry Sound districts of Ontario, wooded districts of Manitoba and Minnesota. Replaced in the West Indies (except Cuba and ? Porto Rico) by *B. p. insulicola* in Antigua, *B. p. rivierei* in Dominica, and *B. p. antillarum* in Martinique, Santa Lucia, St. Vincent, Bequia, Mustique, Cannouan, Carriacou, Grenada, and ? Tobago, where it is resident. Extinct in the Barbadoes. The winter range extends from southern New Jersey, Maryland, West Virginia, southern Ohio, Indiana, and Illinois, southward through Mexico, Central America and western South America to Peru and the head waters of the Amazon river. Rather uncommon in the United States during the winter months. Rare straggler north to Connecticut and Massachusetts.

LOCAL DISTRIBUTION.

CAPE BRETON ISLAND.—One seen (Townsend); not uncom.—Townsend (Macoun); Macoun has evidently misquoted. I have looked up my notes on the subject and find that I saw the bird at Ingonish on Aug. 29, '05; and from my notes and my memory of the case I think the diagnosis was correct (Townsend *ms.*).

NOVA SCOTIA.—Very rare, two doubtful records, one obtained in the market Sept., '88, and another supposed to have been shot at Stewiacke (Downs). Rare S. R. according to H. F. Tufts (Macoun).

I took an immature male at Sherbrooke, Guysboro Co., in Aug. '03, the only definite data, although in Kings and Annapolis Cos., at different times, I have seen hawks that I identified as the Broad-winged (Tufts *ms.*).

NEW BRUNSWICK.—Given by Boardman in 1903 as abundant, and by Macoun, same year, as a rather rare S. R. About the Islands of the Bay of Fundy, S. V., com., breeds (Boardman). Occurs in St. John and King Cos., Dr. Adams states that the Red-tailed and Broad-winged are the most abundant Hawks in the interior (Chamberlain). St. John's, breeding (Banks, Davie). Victoria Co., Grand Falls, not com. (Batchelder).

QUEBEC.—Saguenay Dist., Godbout, very com., some years very abund. migrant and apparently does not nest much along our coast line, but seems to direct itself much further north (Comeau *ms.*). Temiscouta Co., Trois Pistoles, one capture in five years' study, an immature, about Oct. 5, '06 (Le Chasseur *ms.*). Stanstead Co., Coaticork [Coaticook], Mr. Woodward sent up a female, lately doubtless nests in the Province (Couper). Montreal, not com. (Wintle); mention (Shaw); S. R., com., more plentiful during the migratory period (Wintle). Quebec, Mr. John Neilson considers it com. near the city (Chamberlain). Labelle Co., Inlet.—50 m. N. E. Ottawa—single individual Apr. 25, 27 and 28, '05 (Eifrig *ms.*).

ONTARIO.—In 1886 McIlwraith gives it as very com. in spring in southern part, a few remain to breed, but the greater number pass on N. W., and in the western part Morden and Saunders find it sometimes com. in flocks during migrations, at other times single individuals are rather rare. In 1890, a very rare S. R. according to Thompson. In the southern part one of the commonest hawks (Fleming). Macoun states that it is increasingly com. as we go west in the valley of the St. Lawrence and found all over Ontario. He also quotes Rev. C. J. Young, under the head of the Red-shouldered Hawk, that this bird becomes rare in eastern Ont., 15 to 20 miles north of the St. Lawrence, and 50 miles back it is almost unknown, its place seemingly taken by the Broad-wing. Rev.

Young gives but a single record of its nest—May 24, '09, though the immatures are com. near the St. Lawrence in Sept. and Oct. Nash gives it as S. R., breeds throughout. Wm. L. Scott thinks it is the commonest hawk in the Ottawa valley (Chamberlain). Prescott Co., specimen (Worthen ms.). Carleton Co., Ottawa, S. R., com., breeds (Kingston, Lees and Macoun); a regular S. R. (White *ms.*). It seems to be decreasing, have not met with it as often as formerly. A male that came to my hands May 8, '09, was probably one of a pair breeding (Eifrig *ms.*). It is the commonest hawk in the county of Renfrees, near the Ottawa river, and is also com. in the county of Lanark (Macoun). York Co., Toronto, according to Mr. Passmore a considerable number of both young and adults were met with (Venner). Ernest Seton in ms. list of Toronto birds, written in '85, gives it as "com., breeds," but I have not heard of any breeding records, and in my Toronto list I give it as a regular migrant. I have seen few mature birds from Toronto, while immatures are often abundant (Fleming *ms.*). Holton Co., scarce migrant (Brooks); Glenwilliams, Esquesing Twp., May 4, '10, about a dozen observed on the wing, all in adult plumage (Fleming *ms.*). Wellington, O., Gueph, spring and fall visitant, frequent (Klugh, Sweet). Wentworth Co., Hamilton, extensive migrations in March, those met with in the woods appeared to be stragglers from the main body (McIlwraith). Elgin Co., large flocks in fall sometimes, but this is the only time I have observed them (Farley); found breeding (Anderson). Middlesex Co., London, reported (Venner, McIlwraith, Fisher). Essex Co., Point Pelee, fall transient, not more than a dozen seen at any one time, no spring records (Taverner and Swales); Grassy Island, have been unusually abund. (Swales). Muskoka and Parry Sound Dist., com., a large number breed (Fleming, Macoun). Breeds commonly in Muskoka, 36 m. back from Georgian bay, and its squeaky cry can be heard any time of the day throughout the summer (Taverner *ms.*).

Lake Muskoka, one seen on the mainland, the other at Gibralter. This is, however, the most abundant hawk here (Taverner and Swales); Emsdale, breeding (Fleming, Macoun). I think the breeding range is possibly north to the height of land and south to Muskoka. I have always found it well distributed over the country in both Muskoka and Parry Sound, in the breeding season, but have only twice found its nest (Fleming *ms.*). Annina, Nepissing, near Latchford, a pair of juveniles almost fledged, taken from nest (Fleming *ms.*). Lake Restoule, com. in Aug. (Eaton). Algonquin Park, quite com., breeds (Burtch *ms.*). Algoma Co., Moose Factory, a specimen taken in 1862 by James McKensie

(Turner); male (Ridgway); June, '96, Spreadborough found it common on Moose river, but none were seen north of Moose Factory. This may be considered its northern limit (Macoun). Southern extremity of Hudson bay (Blakeston).

MANITOBA.—Reported from various parts of the Province, where well timbered, and is generally distributed, though not abundant (Seton); abound everywhere (Brodie); very rare S. V. on the Big plain. More com., and probably breeding in Red river valley (Seton). Fort Garry, Selkirk settlement (Ridgway). Winnipeg, S. R., rare breeder (Thompson); extends westward to Winnipeg, where it breeds (Macoun); abundant as well as Swainson's (St. Croix); Carberry, doubtful record (Thompson); Carman, breeding (Forge); Woodland, set of eggs taken by W. Raine (Macoun), and by C. F. Forge (Sharples *col.*); Ravenwood, sets of eggs collected by Forge (Price *col.*, Jacobs *col.*). Hyde Park Dist., Duffryn Co., sets of eggs collected by Forge (Jacobs, Jackson and Sharples *cols.*). Portage la Prairie, regular and common breeder in the wooded districts. My first record was on May 1, 1897, when I collected a male, within the week I received a female—both of which I mounted. In May, 1900, between the 12th and 22nd, I took a trip on the Assinaboine river to Winnipeg and noted it regularly all the way down, and on the 16th a nest was found but it contained no eggs (Atkinson *ms.*).

SASKATCHEWAN.—I think that doubtless it will be found in the Alleghenian region of the Manatoba and Saskatchewan, that is reaching the Saskatchewan river on its easterly half. I cannot at present lay my hands on any records west of Manitoba (Seton *ms.*).

ALBERTA.—Apparently a regular summer inhabitant of the southern part of the Athabaska region. On May 8, '03, we saw one in the wooded valley of the Saskachewan near Edmonton. It was in suspicious proximity to an old nest and possibly intended to reoccupy it. Alfred E. Preble and Merritt Cary saw one on the Athabaska a few miles above Athabaska Landing on Sept. 5 of the same year. J. Alden Loring found a nest containing two eggs on Jasper House trail, 12 m. west of Ste. Anne, Alberta, May 27, '96. The female was shot as she left the nest and is now in the collection of the Biographical Survey (Preble), 30 miles N. W. of Edmonton, 114° W. long., and 53½° N. lat. Fairly common, breeding preferably in low birch trees (Stansell).

MAINE.—Uncom. S. R. (Allen). Aroostook Co.; breeding at Houlton (Batchelder), not rare S. R. (Knight); Washington Co., Calais, Com. S. R., breeds (Boardman); Milltown, young birds scarcely fledged (Ridgway); Grand Lake stream, present in June, and also at Alexander, where a set of eggs was collected (Carpen-

ter *ms.*). Hancock Co., quite generally found as a S. R. (Knight). Penobscot Co., breeds quite generally, not quite so commonly of late years as formally (Knight); Holden, May 21, '88, set of eggs taken by Manly Hardy (Bendire). Orono, Apr. 11, '96 (Sweet).

Piscataquis Co., Moosehead Lake, one shot in July (Storer); com., breeds, according to Homer (Knight). Somerset Co., Dead river region, several individuals were seen in the vicinity of Flagstaff, and a specimen secured. I have seen the species on every visit excepting winter (Carpenter); Orland, Alamoosoak lake, present (Merrell); Skowhegan, spring date (Swain); Pittsfield, two sets of eggs collected by Clarence H. Merrell (Crandall *coll.*). Franklin Co., Rangeley Lakes, June dates (Childs); Avon, spring and fall dates (Sweet); Kingsfield, Jerusalem Plantation and base of Mt. Abraham, sets of eggs, 1894-95 (Carpenter *ms.*); New Vineyard, set of eggs by J. L. Colcord, '05 (Carpenter *ms.*); Farmington, spring dates (Sweet). Oxford Co., com. S. R. (Maynard); Umbagog Lakes, abund., apparently the most com. hawk (Verrill); Norway, S. V., breeds (Verrill); breeds commonly according to Nash (Knight); fall date (Johnson); Hebron, May 20, '06 and May 21, '08, and Buckfield, May 5, '96 (Sweet). Waldo Co., not rare S. R. (Knight); Lincoln, 3 sets of eggs, 1899 and 1900 by W. J. Clayton (Crandall, and Dille coll.). Knox Co., migrant acc. to Rockliff (Knight). Kennebec Co., Waterville, found previous to 1865 (Hamlin) and at present time by Royal (Knight); spring date '02, Swain (Sweet). Sagadohoc Co., com., spring and fall, acc. Spinney (Knight). Androscoggin Co., fairly com. S. R., acc. to Johnson (Knight); Livermore, June 9, '97 (Briggs); Lewiston, Sept. 8, '02 (Sweet). Cumberland Co., com. S. R. acc. to Mead (Knight); Portland, uncom. S. R. (Brown); Freeport and Portland, spring and fall dates (Brownson); Brunswick, Apr. 8, '09 (Sweet). York Co., Adams (Knight).

NEW HAMPSHIRE.—Breeds (Samuels); uncom. migrant and S. R. (Allen); com., breeds (Childs); fairly com. S. R. of the densely mixed woods of the sub-Canadian area. In the White mts. region and northward, it is the commonest breeding hawk, but with central and southern N. H. it is less com., except along the ridge of the western part (G. M. Allen). Coos Co., com. S. V. (Maynard, Clark); Mt. Washington, 8 sets of eggs, '90 (Clark); Lancaster and Jefferson, by far the most com. hawk, probably outnumbering all other species put together, though the cutting off of the old growth trees is forcing it further back, as I have never found it nesting in second growth timber (Spaulding ms.); Chickora, White mts., breeding (Bowles); Monadnock, not uncom. acc. to Gerald Thayer (G. M. Allen). Carroll Co., North Conway, breeding, '89

(Nash); Intervale, nest and eggs (G. M. Allen). Grafton Co., not uncom. (Sherman); West of Newfound Lake, where it breeds up to the limit of large tree growth, about 2500 ft., S. R., rare (G. M. Allen). Belknap Co., Alton, two records, May and Aug (Dearborn). Merrimac Co., Webster and adjoining twps., rare only a few seen (Goodhue). Hillsborough Co., Milford, set of eggs (Tilton); Amoskeag, considered irregular visitor until '92, when about 4 pairs undoubtedly nested (Farmer); Millis, set of eggs May 18, '06, by S. P. Willard (Rawson); our rarest hawk (B. G. Willard *ms.*); Hollis, Dr. W. H. Fox found nest and eggs years ago (G. M. Allen); Hudson, female, May 25, '83, by F. F. Jenks (Phil. Acad. Nat. Sci. coll.).

VERMONT.—Not uncom., but seen now and then, breeds (Cutting); not uncom. (Howe); not com. S. R. (Perkins and Howe); uncom. S. R. (Allen). Essex Co., Lunenburgh, com. breeder (Spaulding ms.). Chittendon Co., Burlington, female shot while building nest in Apr., '40 (Thompson). Washington Co., Montpelier, one taken in summer, early '70s (Briggs). Addison Co., Middlebury, Prof. Adams found nest some years since (Brewer). Rutland Co., migrant, rare (Ross); Middleton Springs, not at all com., except during a flight in the fall of '04 (Hickox *ms.*). Windham Co., rare S. R. (Davenport); Londonderry, one observed several times in summer of '95 (Allen), Bennington Co., rare S. R., found most frequently in autumn along wooded streams (Davenport); Bennington, seen June 30, '09 (Ross).

MASSACHUSETTS.—Quite rare (Samuels); to be seen during summer and occasionally winter, but more com as a migrant (Minot); rather rare S. R. (Allen); rare S. R. and not uncom. spring and autumn migrant (Howe, Allen); uncom. migrant and rare S. R. in remote districts (Allen). Eastern, not very com., perhaps breeds, I have not seen it in winter (Maynard). Essex Co., winter, rare (Putnam); not uncom. T. V., very rare S. R. Boxford and Georgetown, breeding; Chebacco Lake, July dates (Townsend); set of eggs coll. by Walter C. Jones (Flanagan ms.). Middlesex Co., Newtown, nest and eggs, '63, and Tyngsburgh, present (Maynard); Farmingham, set of eggs (Norris); Weston, Natick and Concord, spring dates (Peters); Cambridge, T. V., sometimes com. in Sept., rare in spring acc. to Brewster (Chapman). Suffolk Co., during the migrations by no means com. about Boston (Brewster). Norfolk Co., West Roxbury, nest May 20, '64 (Samuels); Brookline (Ridgway); single egg May, '61, by Richie (Bendire); migrant (Howe); Sharon, set eggs May 30' '96, at the time very rare (Bowles *ms.*); Ponkapog, sets of eggs May 18 and 31, '92, and May 21, '04 (2); two yg. females shot near residence in early July, '10,

undoubtedly hatched in pine grove nearby (McKechnie *ms.*). Greylock, June 13, '08, and June 19, '10 (Bridges); Bristol Co., very rare, breeds (Andros); comparatively scarce, I have only met with it from early May to late summer, perhaps half a dozen nests —the bird is gradually increasing in numbers (Durfee *ms.*); Acushnet, instance of capture by Brown, Apr. 12, '82 (Read). During the early years of my collecting, say 10 or 15 years prior to '97, I never even heard of it in this region, though I spent much in the field and was fairly successful in finding all the other common species of hawks and made a specialty of the Raptores. I cannot help thinking that it was much less common than now. It was not until I met Rev. H. K. Job, then living in N. Middleboro, that I began to realize that it was a regular breeder. He showed me two localities where he had taken the eggs in '95, '96 and '97. Mr. Owen Durfee of Fall River also found a nest in the hardwood timber west of Taunton. On May 30, '99, I found my first nest. This was shown me by a young man who claimed to have found a number, and said he considered the species fairly common. Sets were taken in the same locality, near Taunton, in '00 and '01, from the same pair presumably. My experience during the past 10 years in Bristol and Plymouth counties has taught me that it, though hardly common, is by no means rare. As compared with the Red-shouldered, which is our commonest *Buteo*, I should say that there were at least six pairs of the latter to one pair of the Broad-winged. In the region that we hunt most thoroughly in the western half of Bristol Co., comprising an area approximating 10 miles square, we count on locating from 25 to 30 pairs of Red-shoulders, whereas we can hardly expect to find over 4 or 5 pairs of Broad-wings (Bent *ms.*). From '81 up to 1900 I spent fully as much time each season afield here in Bristol and Plymouth Cos. as I have since, but not until May 27, 1900, did I ever find a nest, and only one shot in 1892—and but two surely identified birds seen previous to that; since then it has established itself locally, so much as to be recorded as fairly common (Carpenter *ms.*).

Plymouth Co.: Carver, three sets of eggs (Bent *ms.*); Fairly com. S. R. (Carpenter *ms.*); East Whitman? male, Feb. 29, '92 (C. C. F.). Barnstable Co., Wood's Hole, one noted July 4, '04 (Jones). Worcester Co.: breeds rather commonly (Brewster); nesting (Reed); Lancaster, our commonest hawk with the exception of *Buteo lineatus*. I have found a great many nests that I have left unmolested (Thayer *ms.*). Hampshire Co.: tol. com. S. R. in Connecticut valley (Colburn and Morris); Amherst and nearly the whole county, recorded at Leverett and Pelham (Clark); Monson, set of eggs col. by Milton C. Howe (Crandall *col.*). Hampden

Co.; Springfield (Stearns and Coues); quite rare, breeds (Allen). Breeds regularly and commonly in the mountains west of Westfield, rare in the river town[ships] during the spring and autumn (Morris). Berkshire Co. Rare S. R., found breeding by Mr. Archibald Hopkins, near Williamstown, identified by Mr. Brewer. Mr. R. T. Fisher found a pair nesting near the Cheshire reservoir. Specimen killed in Dalton, Apr. 2, '98. From advice received we believe that this hawk is a tol. com. S. R. on the eastern slope of the Green mts. in adjoining counties of Hampshire and Hampden (Faxon and Hoffman).

RHODE ISLAND.—Large flights in certain sections (Dunn); an uncom. migrant and rare S. R. (Howe, Allen). It is of very local distribution and I am not aware of it nesting east of the Narragansett bay and the Providence river. The most northern breeding record is Gloucester, Providence Co., and the most southern at Wakefield, Washington Co., May 10, '03, nest completed but not revisited. The woods in the western part of the state have been cut in recent years, greatly reducing favorable localities for all of the hawks to nest in. If any one was to ask me to find a nest this year I do not think I could do it, with the possible exception of South Kingston, where I found a nest but no eggs some 4 or 5 years ago. There is a probability of one or two pairs in the neck of woods in the northern part of the state, however. At Charlestown, in the open woods just north of Quawchontang pond, I saw a young bird Aug. 4, '06. A nest with two young just hatched and an egg which was pipped, was found June 19, '07, by Walter A. Angell in West Greenwich. On June 9, '10, I saw two birds in open woods near Summit (Hathaway *ms.*). My experience has been that Broad-wings do not return to the same locality year after year. In only one instance have I found a nest in the same grove in two successive years. The four nests taken in '06 were all within an area of two square miles, yet not a single pair returned to this locality in '07 (Flanagan *ms.*). Records of the collection of sets of eggs: Providence Co., May 27, '05, by F. and J. Flanagan; Gloucester, May 13, '90, by Wm. A. Sprague; May 19, '02, by Walter A. Angell; Cranston, May 11, '00, and May 24, '01, by H. S. Hathaway; Smithfield, June 2, '94, by W. A. Angell, who shot the female; Kent Co., May 19, '04, by J. H. Flanagan and C. H. Remington; May 26, '00, May 26, '01 (2), May 13, 19 and 27 (2), '06, by T. and J. Flanagan; Washington Co., East Greenwich, occupied nests found May 13, '00, and June 9, '01, by F. E. Newberry; Kingston, by Prof. Geo. Field, while at the Agricultural Experimental Station, eggs since destroyed and no date kept (Hathaway *ms.*).

(Merriam); found breeding (Wood); S. R., but breeds sparingly;

CONNECTICUT.—Rather rare resident, seldom seen in winter very regular and abundant in flights from the middle to the last of Sept. (Trowbridge); uncom. migrant and rare S. R. (Allen); Western Conn., not our commonest hawk by any means. Found nesting along the mountain streams (Job), Southern Conn., com. (Job); New London Co., Norwich, two sets of eggs, '84 (Rawson); regular S. R., breeds, formerly rare, 6 sets taken by Thos. B. Trumbull and Lorenzo Blackstone, '95-'99, Chauncey Brand showing the former his first nest (Richards *ms.*); Middlesex Co., 3 sets of eggs between '99-'03 (Beers *ms.*); Portland, Mr. W. W. Coe has taken quite a number of its nests, together with several of the finest birds I have ever seen (Merriam); present (Sage); Middle Haddam, breding (Case); specimen (Fisher); Chester, sets by C. H. Watrous and H. Bennett (Beers coll.), and by J. B. Canfield (Crandall *col.*); New Haven Co., it breeds sparingly about New Haven (Merriam); a very rare bird (Linsley); 2 sets, 1906 (Beers *ms.*) fall migrant (Trowbridge); Seymour, 2 sets '06 by A. A. Lockwood (Beers *ms.*); Northford, set taken by A. M. Linsley (Lattin); Northfield Co., 3 sets June 8, '04 (Beers *ms.*); Torrington, several sets coll. by John Gath (Jacobs, and Price *coll.*); Winchester, 7 sets, '86-'96, 3 sets in one day, by Chas. H. Williams (Crandall coll.); Fairfield Co., com. breeder (Hamlin *ms.*); an uncom.. resident (Wright); 23 sets of eggs '96-'06 (Beers ms.); Bridgeport, resident [?], sometimes com. in migration (Verrill); Bethel, 12 sets coll. by Geo. L. Hamlin, '86-'96 (Jackson *coll.*); Monroe, set May 24, '98, by H. W. Beers (Crandall *coll.*); Fairfield, set May 15, '99, by Beers (Sharples *coll.*); Stratford, female taken, spring of '41, compared with spec. in Peale's museum, New York, and identified by Audubon (Lindsley).

NEW YORK.—Rare (DeKay); not com. permanent resident (Chapman). Hudson Highlands, our most abundant hawk, a permanent resident, but only occasional in winter, breeds (Mearns). Mohawk Valley,, it is doubtful if in any one district it is to be found in greater numbers (Willard). Adirondack Region, rather com. S. R., breeding about the lakes (Merriam). Western Adirondack Region, present (Hall). Western N. Y., S. R., breeds, not always as com. as *B. borealis* and *lineatus* (Short, Eaton); rather rare S. R., breeds (Reineck). Long Island, exceedingly rare (Giraud); Bay Ridge, fall migrant (Townsend); Long Island City, 3 spec. Sept. 23 and 24, '87 (Fisher); Orient Point, one seen Dec. 25, '05 (Latham); College Point, one Dec. 29, '97, (Abbott and Harper). Franklin Co., one shot Aug. 24, '74, (Roosevelt and Minot); Saranac Lake, one spec. (Baird). Clinton Co., Upper Chateaugay Lake, Sept. (Howe). Warren Co., Lake George, Aug. 2 (Fisher). Ham-

ilton, Herkimer, and Oneida Cos., found in considerable numbers by Dr. Ralph (Bendire). Herkimer Co., Wilmurt, breeding acc. to Ralph (Bendire). Oswego Co., Oswego, regular breeder (Stone); the Broad-winged and Red-tailed Hawks used to be here in goodly numbers, but I have seen only a single one in years (D. D. Stone *ms.*); set col: by L. C. Snyder (Short *ms.*). Saratoga Co., Outlet creek, Balston Spa, set of eggs (B. A. G.). Fulton Co., Mountain Lake, rather rare, one seen Aug. 26, '07; I have seen many specimens in E. P. Hotaling's taxidermist shop at Gloversville (Alexander *ms.*). Oneida Co., not com., breeds (Ralph and Bagg); Utica, two eggs (Willard); generally distributed, nowhere com., breeds (Trembly); found nesting in '73, and later at Mud creek (Davis); one of our rare hawks, have collected but two sets. I have just finished rewriting my List of Oneida County Birds and will give this species as "A com. S. R. in West Canada Creek Valley. Not com. elsewhere. Breeds. Several nests on record in the town[ship] of New Hartford." Dr. Langworthy's, Trembley's, Davis', and my own nests were all taken in that town-[ship]. I have spent at least part of every year for the past 35 years in West Canada Creek Valley and am disposed to consider it the commonest hawk. Here in Utica, I think I would place the hawks as follows as to abundance: Red-shouldered, Red-tailed, Sparrow, Sharp-shinned, Broad-winged. Others follow. I do not think it is a very rare breeder with us, but the two larger hawks are so much more common that this bird is considered rare by comparison (Bagg *ms.*). Rensselaer Co., Troy, Sept. specimens (Fisher); Stephentown, tol. com., four nesting places within five miles (Hoag). West Chester Co., one May 8, '04, F. C. Hubel (Jones); breeding (Burroughs); Sing Sing, tol. com. acc. to Fisher (Chapman). Orange Co., Highland Falls, Apr., May, and Aug. Specimens (Fisher). Rockland Co., Mr. Bell informs me that he killed several in one day (DeKay); specimen Aug. 17 (Fisher). Ulster Co., near Ellenville and Lake Minnewaska, large flights in Sept. (Barbour); Valley of Navesink river, pair July 27-Aug. 5, '98 (Bent *ms.*). Madison Co., S. R. (Embody). Cayuga, Onondago, Seneca, Wayne and Yates Cos., rare S. R., breeds (Rathbun). Onondago Co., Syracuse, spring specimens (Fisher). Cayuga Co., Auburn, rarest of all the family that breed here, I found one set only (Wilson); nest May 18, '83, not very com., but was regularly met with (Rathbun *ms.*). Cortland Co., rare (M. D. M., Jr.). Tompkins Co., Ithaca, one shot Aug. 25, '98, by Mr. W. C. Thro (Hankinson *ms.*). Cayuga Lake Basin, transient (Reed and Wright); Chemung Co., I have not been able to obtain a specimen, altho' I have no doubt it will be found here (Gregg); Elmira, June

27, '85; Apr. 9, '86; July 23, '87 (Swift); specimens in spring and summer (Fisher). Yates Co., rare, one Sept. 10, '75 (Gilbert); Branchport, does not occur, have not seen one in 20 years' study (Burtch *ms.*). Monroe Co., Rochester, abundant migrant, does not breed (Eaton). Orleans Co., taken by Fred Lusk (Posson). Niagara Co., rare, I do not know that it breeds (Davidson); Lockport, spring date (Fisher). Erie Co., Buffalo, rare straggler (Bergtold). Probably breeds (Reineck). Chautauqua Co., rare (Edson). Medina and Albine, Orleans Co.; Lockport, Niagara Co.; Naples, Ontario Co.; Rochester and Brockport, Monroe Co.; Erie, Cattaraugus, and Genessee Cos., S. R., breeds (Short).

NEW JERSEY.—Frequently more numerous than supposed to be. Breed every season in the hilly, wooded districts (Abbott); a resident species in the southern part, and S. R. in the north, but nowhere common in the winter and not as abundant as the Red-shouldered Hawk in summer (Stone); occupies certain sections to the exclusion of its congener (Red-shouldered Hawk), the habitats of the two being complimentary (Miller) Pine Barrens, tol. com., no actual record of breeding but individuals are seen during the summer (Stone). John Krider has several times met with nests near Philadelphia (Brewer). Passaic Co., Greenwood Lake, one observed in June, '09 (Baily). Sussex Co., Stag Lake, extensive autumnal migrations, transient (Von Lengerke); Wawayanda Lake, one observed in June, '09 (Baily). Bergen Co., Ridgwood, rare (Hale *ms.*). Essex Co., Montclair, frequent transient, spring and fall (Howland). Union Co., Summit, very rare S. R., (Holmes, Hann). Somerset Co., Plainfield, spring date (Miller). Middlesex Co., South Amboy, fall flights (Muirhead). Monmouth Co., Atlantic Highland and Sandy Hook, autumnal flights (J. P.). Mercer Co., rare, more frequently seen in winter (Abbott). com. S. R. and migrant, breeding (Babson); Feb. 7, Apr.-June, Dec. 9 (Rogers). Camden Co., Haddonfield, May 16, '82, by S. N. Rhoads (Phila. Acad. Nat. Sci. coll.). Burlington Co., Moorestown, I am not certain I ever saw the bird alive here; Anna A. Mickle mounted a female shot at Mount Ephraim, on May 12, '01 (Evans *ms.*). Salem Co., Salem, very rare breeder, rarely seen at any time, I am not certain but that it is a resident the whole year. Three nests: May, '98, May 27, '00, and May 23, '00 (Crispin *ms.*); set May 20, '97, by B. A. Carpenter (Crandall *ms.*). Cape May Co., Wm. B., Crispin thinks a few pairs breed, and Alfred C. Redfield has also met with it in summer. Atlantic Co., Somer's Point, set of eggs, '69 (Jackson *ms.*).

PENNSYLVANIA.—Dr. Trudeau found nest and eggs (Brewer); rare, most frequently seen in winter (Turnbull); uncommonly

scarce, but few individuals being observed during the autumnal and winter months (Gentry); least abund. of all the Buteos, a native and resident (Warren); rather scarce resident (Stone); among the least numerous, S. R., migrating southward (Surface). Sullivan and Wyoming Cos., summer (Stone). Pike Co., dead bird secured from a farmer's barn door, Sept. 9, '02 (Laurent *ms.*); noticed in '05 (Harlow); set of eggs coll. for Rath (Crandall *coll.*); Milford, not com., breeds (Woodruff); Monroe Co., breeding (Davie, Norris); Broadhead's Creek, pair breeding (Weygaundt); Northampton Co., breeding (Davie); two sets coll. for J. Rath (Crandall *coll.*); Blue Mts., two sets (Norris). Bucks Co., frequent (Thomas); Spring Valley, one spec. (Fisher). Montgomery Co., Fatland Ford, first nesting record, May 27, 1812 (Audubon); set of eggs coll. by Dr. W. E. Hughes (Del. Valley Orn. Club data); Lower Merion Twp., set of eggs May 12, '89, by Harry K. Jamison (Crandall *coll.*); Narberth, resident, not abund., apparently breeds (Rotzell); Oaklane, several noticed in Sept. '06 (Harlow). Berks Co., Fleetwood, nest and eggs, '02, '03 and '07, also one nest near Moselem, '07 (Leibelsperger). Philadelphia Co., Gray's Ferry, pair seen, male shot May 6, 1812—the type specimen (Wilson); Germantown, spring spec. (Fisher); Holmesburg, May 17, '08 (Miller); Fox Chase, young male Sept. 8, '08; and Frankfort, lined nest May, '02, one bird about for a time, but female probably shot (Miller *ms.*). Delaware Co., occasional in winter (Cassin); wintering (Moore); set of eggs, May 14, '85 (Parker); Radnor Twp., 3 spec. by Dillon (Phila Acad. Nat. Sci. Coll.), breeds, uncom. (Rogers); nest and eggs (Harlow); Swarthmore, spring date (Roberts); set of eggs, May 6, '05 (Swayne *ms.*); Marple Twp., nest May 18, '09 (Mercur *ms.*). Elwyn, spec. Apr. 26, '98, C. S. Welles (Phila. Acad. Nat. Sci. Coll.); Castle Rock, nesting (Sharples); Grant Groff found it breeding near Radnor Hunt, '94 and '95; Alfred C. Redfield near Wayne, '08 and '09; and the writer in Newtown Twp. (Burns *ms.*). Chester Co., I found 4 nests (Warren); resident, breeds (Ressel); Avondale, resident and quite rare (Michener); East Marlboro Twp., set of eggs May 20, '06, resident, I never considered it an abundant breeder (Pennock *ms.*); West Chester, adult shot (Montgomery); set of eggs May 24, '75; by J. T. Price (Jackson); West Goshen Twp., set col. May 28, '96, by Chas. Darlington, three sets '86, '88 and '90 by Thos. H. Jackson. I have known 4 or 5 pairs which nest here every year. Some years ago the Red-tailed Hawk was a com. nesting bird, but lately it has almost disappeared and the Broad-wing has taken its place until it is one of the most abund. (Sharples *ms.*); Marshallton, May 19, '00, set by Frank Marshman; Brandywine val-

ley, May 19, '04, and near West Chester, May 16, '03, sets by R. P. Sharples; Hershey's Mill, set May 3, '91, by S. B. Ladd (Jackson and Sharples *ms.*); West Bradford, breeding (Burns *ms.*); Brandywine Hills, sets May 15, '05, and June 1, '06, by W. Woodward (Sharples *ms.*); near Coatesville and near Downington (Sharples); Malvern, nest, by Wm. Everett, May, '86 (Jackson); Paoli, Daylesford (earliest breeding record, May, '84, by Wayne Baugh), and Berwyn and Devon regular S. R., breeding, first set May 11, '88 (Burns *ms.*). Lancaster Co., rather rare (Libhart); Columbia not com. (Wisler *ms.*). York Co., one noted May 1, '04, first in 16 years' observation (Wisler *ms.*). Dauphin Co., Harrisburg, by no means com. I have but one record, a male, taken Mar. 21, '95, though I do see some birds flying high over the city during migrations (Stoey *ms.*). Cumberland Co., Carlisle, rare (Baird). Perry Co., Pilot Knob, com. transient visitant in flight during Sept., '88 (Roddy *ms.*). Clinton Co., Renova, one of our most com. hawks and regular breeder (Pierce *ms.*). Erie Co., Erie and Presque Isle, recorded by our party on but two occasions, but probably a S. R., immature male shot May 26, and one seen Sept. 21; Mr. Bacon saw one from this locality (Todd), Clarion Co., Maysville, spec. shot June 15, '94, my nearest Pittsburg record (Todd *ms.*). Green Co., in the summer of '04 a pair inhabited a large strip of woods south of Waynesburg (Jacobs *ms.*). Fayette Co., Leckrone, Sept. 24-Oct. 8, '01, one or two in woods back of station during my stay (Burns *ms.*).

DELAWARE.—Resident (Rhoads and Pennock). Newcastle Co., Townsend, one recorded June 28, '00 (Burns *ms.*).

MARYLAND.—Resident except severe winters, but at no time abundant (Fisher); resident, but not com., eggs Apr. 27, '90; May 19, '92—Blogg; May 23, '93—J. H. Fisher, Jr. (Kirkwood). Anne Arundel Co., West River, fall '89, appeared in greater numbers than ever before (Ellzey); Montgomery Co., Sandy Spring, number of spring and summer records (Fisher); eggs, May 10, '87, col. by Dr. A. K. Fisher (Bendire); one set in '91 and three in '92 (Kirkwood); near Tacoma Park, nestlings, '97 (Shufeldt). Howard Co., fall, '89, extraordinary numbers of hawks, Broadwings predominating (Ellzey). Alleghany and Garrett Cos., not com. (Eifrig ms.). Allegany Co., one on Wills' Mt., July 28, '02, and numerous Sept. 4-Oct. 17, also records from various localities, one Dec. 31, '01 (Eifrig *ms.*). Garrett Co., one taken on summit of ridge about 3 m. east of Grantville (Preble); Occident, July 22, '03, immature female brought to me (Eifrig *ms.*).

WEST VIRGINIA.—Resident, tol. com. (Edwards); tol. com., several spec. taken (Doan); com. (Brooks). Monongalia Co., Mor-

gantown, while hunting here below town in the fall of '06, a man killed one and brought to me for identification, the only one I ever saw about here (Morgan *ms.*). Upshur Co., remains throughout the year (Brooks); Buckhannon, Aug. 12, '88 (Fisher). Kanawha Co., com., found mostly in the mountains, breeds (Scott); Coalburg, com. and breeding (Scott). Putnam Co. In the spring of '01, my brother and I found a nest in a tall hickory tree; he shot one of the birds, and a few days later he killed another in a different part of this locality that acted as though it had a nest close by. I have not found it very common in the parts of the state I am acquainted with (Morgan *ms.*).

VIRGINIA.—Occurs (Whitehead); occasionally seen, but not of sufficient abundance to make it of much economic importance (Smyth). Montgomery Co., saw Sept. '93, a flock of 13, all flying south and very high (Smyth); Blacksburg is in a valley on the top of the Alleghany system, about 2020 ft. above sea level, and the country around it is rugged, with many wooded and wild ravines. I believe that it nests regularly though sparingly throughout the mountainous section. In past years, nearly every spring, in late April or early May, when I used to be out frequently after insects, observing bird arrivals and collecting flowers for my botany class, I saw these hawks, usually very tame and acting as if nesting, and I once saw a pair attacking and driving away from their chosen haunts a Red-shouldered Hawk. I never, however, saw its nest until May 18, '06, when a farmer brought me an incubating female. I went with him intending to get the nest and eggs, but it was in an enormous white oak. It is not abundant, tho' I count it in my list of regular breeders (Smyth *ms.*); Fairfax Co., near Washington, found breeding by Dr. Fisher and Mr. Henshaw in '85, rare resident (Rives); Centerville Twp., set May 19, '91, by Harry K. Jamison (Crandall *coll.*); Falls Church, not uncom. breeder (Riley); numerous breeding records (Riley *ms.*). Hanover Co., Ashland, one seen Mar. 15, '06 (Embody *ms.*). Warwick Co., I saw one a negro had shot, May, '87 (Phillips).

DISTRICT OF COLUMBIA.—(Jouy); very rare, only occasionally observed (Coues and Prentiss); rare, probably resident, more in winter (Coues and Prentiss); not com. (Richmond); nesting in the National Zoological Park (Baker); rare and occasional (Rives); not com. W. V., rare S. R., according to C. W. Richmond (Chapman); breeding (Maynard); permanent resident (Cooke); not uncom. breeding bird (Riley).

NORTH CAROLINA.—Wake Co., Raleigh, specimens May 23, '88, Aug. 26, '89, May 8, '95, and sets of eggs: Apr. 25, '90; May 18, '91; and May 11, 16 and 22, '95 (Brimley *ms.*). Mitchell Co., Roan Mt.,

Aug. 10, '87 (Fisher). Buncombe Co., S. V., com. (Cairns); set May 28, '01, for S. B. Ladd (Sharples *coll.*); Weaverville, found breeding by John S. Cairns (Bendire); Grace and Craggy mountain, sets of eggs June 18, '94, and May 8, '86, by Cairns (Crandall *coll.*). McDowell Co., Black Mts., 6,000 ft., single bird (Brewster). Jackson Co., Webster, a pair (Brewster).

SOUTH CAROLINA.—Listed by True; probably occurs, but I have no evidence that such is the case (Coues). The record by Mr. F. W. True is based on presumptive rather than positive evidence. The list is crude and full of errors. Coues' list is full to overflowing with errors. I have but two records on or near the coast. On April 26, '86, while in the company of Dr. A. K. Fisher, he identified a bird of this species which was about 400 yards away. The second record is of a specimen that I shot near Charleston on June 15, '89. It seems to be very rare even in the primeval forests. As far as I am aware, it does not breed. While it is possible that it breeds in the primitive forests, the fact remains that no well authenticated record is extant (Wayne *ms.*). It probably occurs, however, along the upper Savannah river (Wayne).

GEORGIA.—Resident (Cleckly). Does not appear to be common. Hawks seem to be less abundant than in any other section where I have been, Red-tailed, Cooper's and Sparrow Hawk being the only species that abound. Red-shouldered, Sharp-shinned and Marsh Hawks being less in abundance. The Broad-winged Hawk and Mississippi Kite being rare—though I am fortunate to have a fine pair of the latter—and the Duck and Pigeon Hawks and Swallow-tailed Kite being very rare (La Prade *ms.*). While labeling up our collection—Savannah, Natural History Society—recently, I came across a hawk which I was convinced was originally wrongly marked, and upon close investigation it turned out to be a Broad-winged Hawk, immature male taken Mar. 11, '08. It is the only one in our collection, and in fact the only specimen I have ever taken (Hoxie *ms.*). Cherokee Co., on July 11, '05, I found one nailed to a tree, having been shot by some hunters some days before. I had previously seen a pair in this vicinity, but failed to get close enough for positive identification, tho' my impression was that they were of this species (La Prade *ms.*). Fulton Co., June, '06, exact date not recorded, I heard the Killdeer-like cry in some heavy timber. The bird flew before I got in range and I failed to get it in the chance shot I tried. W. J. Mills, formerly of East Point, but now of College Park, has a set of eggs taken in the county that I consider *probably* of this bird; though I am not oologist enough to be a competent judge. He took them some years before he was acquainted with our birds, being a native of Eng-

land (La Prade *ms.*). Atlanta, six seen Dec. 25, '03 (McDaniel). Newton Co., Oxford, I have for seven years been trying to secure one for the Emory College collection. Yesterday, Apr. 27, '08, I took an immature male in thick woods (La Prade *ms.*). In a memoranda of a collection of eggs made chiefly on St. Simon's Island (Glynn Co.), Wayne and McIntosh Cos., during '53-'65, by the late Dr. S. W. Wilson; H. B. Bailey notes the species—"nests in high trees, eggs two or three." Camden Co., St. Marys, it does not breed. In fact I have taken but one and seen one other, both in winter. It may, however, breed in other parts of the state, as it is no more rare here than the Mississippi and Swallow-tailed Kites, and the latter at least is quite common in some sections (Arnow *ms.*).

Florida.—There is a specimen in the Museum of Comparative Zoology labeled as having been taken in Florida (Allen). One spec. each by Dr. E. G. Abadie and Thos. McEuen (Phila. Acad. Nat. Sci. Coll.). Bird appears nowhere a very common species, with perhaps the exception of the peninsula (Brewer). Eggs found by Gustavus Wordemann (Baird, Brewer and Ridgway). Kissimmee Valley, one seen Feb.-Mar., '95 (Palmer). Jefferson Co., one of the commonest hawks found breeding in the hill country and on the Wacissa river (Wayne); while I did not collect any sets of eggs, it is a *common* breeder near Waukeenah. Shot a female Apr. 21, '94, that contained an egg ready to be laid (Wayne *ms.*). Leon Co., Tallahassee, common resident, breeds (Williams); there is scarcely a strip of woods of 50 acres or more wherein are not found a pair of these birds (Williams *ms.*). Walton Co., De Funiak Spring, somewhat rare, May 2, '08, I shot an adult female and observed another Apr. 23, '10, at Lake Cassidy, and an adult male in a cypress swamp, June 23, '10 (Fisher *ms.*). Scambia Co., Pensacola, one seen, spring of '86 (Everman). Volusia Co., Coronado, Dec. 30, '08 (Longstreet). Hillsborough Co., not present to my knowledge (Hoyt *ms.*); reported breeding (Bendire). Manatee Co., it has been reported breeding and an egg collected by H. B. Moore, Manatee, spring of '72, and now in the U. S. National Museum collection, entered as one of *B. lineatus*, seems much more likely to be referable to this species (Bendire). Lee Co., Fort Myers—Caloosahatchie region—migrant (Scott); seen (Maynard) Key West, single one Feb. 3, '88; 150—mostly of this species.—Oct. 21, '87 (Scott).

Alabama.—Found (Oberholser) Hale Co., only one specimen has come under my observation, that was shot and mounted by Dr. J. M. Pickett of Cedarville. I have the specimen in my collection (Avery). Coosa, Clay and Talledega Cos., abundant soon after

May 25, '08 (Saunders). Mobile Co., Mobile, Dr. A. K. Fisher tells me that he saw a pair in May, '86 which acted as if they had a nest in the vicinity (Bendire).

MISSISSIPPI.—Resident, rare breeder (Stockard). Not a common resident. It gathers in small flocks for migration together with *Ictinia* in late summer and usually all are gone by the first of Sept. I have not seen it in winter (Allison *ms.*). Pine flats region (Kopman). Tishomingo Co., the commonest of the hawks—Apr. 17-May 17—I found no nests, but saw and heard the birds often (Allison). Lafayette Co., three sets of eggs in one season (Norris). Franklin Co., Suffolk, not met with up in this section; its occurrence has been reported to me from near the Gulf (Kent *ms.*). Wilkinson Co., Woodville, two observed Dec. 25, '09 (McGowan). Coast of Mississippi, com. S. R. (Kopman).

OHIO.—Not com. resident except perhaps in winter, breeds. In the vicinity of this city it is rare. Dr. Kirtland says that it is com. and breeds in Northern Ohio. Mr. Read that it is frequently seen (Wheaten). Not com. S. R. (Dawson). Little known, not because it is rare, for it is present in some numbers throughout the state; but because it apparently differs but little from several medium sized hawks. It should be found wintering south of Columbus, but probably in small numbers (Jones). Stark Co., Canton, single individuals, Apr. 18, '09, Mar. 27, Apr. 24 and May 15, '10 (Kimes ms.). Mahoning Co., Youngstown, one seen Dec. 25, '06 (Fordyce and Wood); Poland, male adult—Kirkland (Sharp); spec. in British Museum (Gray). Cuyahoga Co., Cleveland, tol. com. migrant and S. R. (Anon.); Brooklyn, May 10 (Fisher). Lorain Co., Oberlin, rare permanent resident (Jones); spring dates (Baird); present, noted in May, '97 (Dawson); two, winter of '02, usually near Lake Erie (Dawson); Cedar Point, sometimes com. for a day or so during migration, unusual in winter and rather scarce in summer (Jones). Wayne Co., rare, probably S. R., only two records available: that of an adult shot on the grounds of the State Agri. Exp. Station at Wooster, July 4, '93; and one seen about six miles north, July 9 same year (Oberholser). Knox Co., breeds (Davie). Franklin Co., Columbus, S. R., com. (Davie); resident (Dawson). Auglaize Co., one seen May 14, '08 (Henninger and Kuenning). Miami Co., Troy, male killed Apr. 27, '07 (Fisher *ms.*). Green Co., Yellow Springs, nest and eggs by W. M. Wilson (Wheaton). Warren Co., rather uncom. S. R., Apr. to Nov. (Smith). Hamilton Co., Cincinnati, S. R., and Madisonville, Apr. (Langdon). Scioto Co., Southwestern, May 28, '96 (Henninger).

INDIANA.—Rare in most localities; resident in southern part, S. R. northward, not com., most often seen in spring and fall (Butler).

Lake Co., breeds—Aiken (Butler). Wabash Co., two spec. taken (Ulrey and Wallace). Carroll Co., occurring occasionally (Everman). Franklin Co., rare, probably resident (Butler); Brownsville, Apr. 19, '87, and Decatur Co., Apr., 22, '87, spec. (Fisher). Monroe Co., rather rare R., not reported before '92, more often seen in recent years, commonest in Apr. and Oct. (McAtee). Knox and Gibson Cos., breeds (Ridgway).

ILLINOIS.—Resident, one of the rarest species in most localities (Ridgway); transient, breeding in the northern part (Ridgway); not uncom. first week in May and during Sept. in N. E., a few breed (Nelson); com. during migrations and more or less com. S. R., breeds in many localities (Cory); fairly com. during migrations, isolated pairs breeding here and there, but not com. as a S. R. in any given locality (Gault *ms.*). Lake Co., Lake Forest, fall '95, one in company with other species in flight (Ferry). Cook Co., Chicago, present '88 (Pratt); abund. trans. (Dunn); not uncom. S. R. (Woodruff); South Chicago, flight Apr. 27, '92 (Dunn); Grand Crossing, Sept. 6, '84, male shot (Coale); River Forest, male taken May 11, '81 (Gault *ms.*). Du Page Co., Glen Ellyn, not com. T. V., one or more recorded every spring and fall, with few exceptions, since '93, evidently breeding pair noticed May 1-24, '10, but no nest located (Gault *ms.*). Will Co., Joliet, set of eggs May 10, '06 (Cory). Marshall Co., rare, confined to river bottoms (Barnes). Fulton Co., Bernadotte, Spoon river region, pair Jan. 13, '87 (Strode). Hancock Co., Mallard, spec. Oct. 8, '00 (Fleming coll.). Adams Co., Quincy, found breeding by Poling (Davie, Bendire). Champaign Co., Philo, breeds, 4 yg. taken from nest (Hess *ms.*); not rare S. R., seen each season at Lynn Grove and Salt Fork (Hess). Bond Co., not very plentiful, the country is right for it, but its place seems to be taken by the Red-tail and Red-shoulder, almost every grove containing one or two pairs of the former (Smith *ms.*).

MICHIGAN.—(Stockwell, Miles); nesting (Herbert); S. R., breeding (Steere); rather rare, breeds (Gibbs); com. S. R. (Cook). Southern, trans. (Bois); cannot be called com., neither is it rare; I have never known it to breed (Covert). S. E., it is rather an uncom. but regular migrant, extreme dates: Mar. 10, '94, and Oct. 24, '97; normal Apr. 20 and Oct. 5 (Swales *ms.*). Washington Island, S. W. end of Isle Royale, 5 observed Sept. 5, '05 (N. A. Wood *ms.*). Ontonagon Co., Ontonagon, Aug. '04, not com. (N. A. Wood *ms.*); Porcupine mts. 1 yg. male and ad. female Aug. 12 (Wood. Peet and McCreary). Iron Co., one each on Menominee river, Aug., and upper course Iron river, Sept. (Blackwelder). Dickinson Co.,

Iron mt., not uncom. in summer, but never found its nest (Brewster *ms.*). Chippewa Co., set May 16, '01 (Stone *coll.*). Mackinac Island, one Sept. 1, '89, rare (White); Huron Co., Port Austin Twp., annual spring flight (J. C. Wood *ms.*). Emmet Co., Wequetonsing, nest near golf links (Widmann). Kent Co., breeding—White (Cook). Eaton Co., Lansing, one shot at Agri. College and another Sept. 10, '96, by E. M. Sedgwick, now in my coll. (Hankinson *ms.*). St. Clair Co., Pt. Gratiot, set May 15, '98 (Arnold *ms.*). Wayne, S. Oakland, E. Macomb, S. St. Clair Cos., fairly abund. migrant. I am positive it breeds, but to my knowledge no eggs have been taken (Swales). Wayne Co., most com. during the latter half Apr. and early May, when from singles to 200 or 300 may be seen at one time in the air, few adults alight, but many of the juniors do so and some remain in suitable localities until middle of June, four breeding records (J. C. Wood *ms.*); Highland Park, only one breeding record, Apr. 29, '93 (Swales); Nankin Twp., nest '01, no eggs (J. C. Wood *ms.*); Detroit, male shot June 7, '07, non-breeding upon dissection (Swales *ms.*); I have seen more birds passing over city than elsewhere (J. C. Wood ms.). Genosee Co., Goodrich, spec. (Spicer). Washtenaw Co., Ann Arbor, com. (Steere); not very com. migrant, one breeding record, June 25, '01, birds taken but nest inaccessable (N. A. Wood). Monroe Co., Petersburg, not uncom., breeding (Trombly, Cook); Portage Lake, fall record, Oct. 12 (N. A. Wood *ms.*).

Summerfield, set col. by Jerome Trombly, May 18, '92 (Jackson *coll.*). Hillsdale and Lenawee Cos., a retiring bird found only in deep woods (Gibbs). Kalamazoo Co., as an evidence of its rarity here, in over 500 nests of the *Buteos* robbed, only one set of this Buzzard was taken—May 27, '75 (Gibbs).

WISCONSIN.—Com. (Hay, Goodrich); com. in northern portion where it breeds in the heavy timber (King); not rare, especially in the oak openings; as far as my experience goes, it seems to prefer second growth black "jack" or "pin" oak forests (Kumlien). Eastern Wis., rather com. spring migrant, especially common in fall; by no means com. nesting species, but is a S. R. and breeds from the southern tier of counties northward. According to our observations this is the species that flocks (Kumlien and Hollister); male and female, Sept. 9 and 21 (Ridgway); com. during migrations, more or less com. S. R., breeds in many localities (Cory). Dunn Co., Mr. Clark considers it on the whole uncom., but has seen and taken it a number of times (Kumlien and Hollister). Clair [Clark?] Co., a spec. taken—Cowper (King). Ontegamie Co., com. in large woods (Grundtaig). Waukesha Co., Pewaukee, I found them nesting and most com. (Goss); breeding, set June 8, '88 (D.

C.). Jefferson Co., Lake Mills, breeding—Cantwell (Bendire). Richland Co., Twin Bluffs, com. (McCallum).

KENTUCKY.—Fayette Co., Lexington, my records are all queries, I have never examined it in hand. The ms. in *Bird Lore* Christmas Census had it and some of the Ducks queried; the one we called Broad-winged Hawk was never identified with any centainty (Dean *ms.*). May 7 and Dec. 25, '04, March 18, '05—[Dean?] (Cook *ms.*). Logan Co., Nov. 28, '03 (two); Oct. 25, '04; Apr. 9 and 14, May 5, 14 and 26, '06, single individuals. While I have not found in the nest, the above data shows that it occurs well into the breeding season. I am inclined to consider it a rather rare breeder and uncom. migrant and winter visitant (Embody *ms.*).

TENNESSEE.—East: This is the most abundant hawk, especially so among the mountains, where I found it at the loftiest mountains (Rhoads). Near Roan Mountain Station, July 24, '95, seen (Cooke *ms.*).

MINNESOTA.—S. R., fairly com. from the border of Iowa to Lake Superior, rare in the N. W. sections (Hatch). Very numerous, the most abund. of all the hawks (Brackett, Cantwell). Headwaters of streams that feed in Red River of the North, breeding abundantly (Preston). Polk Co., Red Lake Falls, male by F. Guy Mayers (Phila. Acad. Nat. Sci. Coll.). Atkin Co., Farm Island Lake, com., breeding (Peabody); Atkin and Hickory, several noticed (Gault *ms.*). Beeker Co., abund. (Roberts); Floyd Lake, several sets (Norris). Otter Tail Co., Mr. Washburn found it rather com. (Hatch); Pelican river, set of eggs (Norris); one pair nested near Crystal lake, two eggs were taken May 28, '93, and afterwards found to be the commonest hawk in nearly all the localities visited. Almost every piece of woods of any extent was found to harbor a pair. Another set was taken at Linda June 3. Not found at Pelican Rapids (Gault *ms.*). Grant Co., Herman, single individual (Roberts and Benners). Lac-qui-parle Co., breeding (Cantwell). Hennepin Co., set taken by H. M. Guilford (J. C. Wood *coll.*); Minneapolis, com. 7 sets within 5 m. radius of center of city (Currie); breeding (Patten, Cantwell); set taken by H. B. Hurd (Crandall *coll.*); breeding frequently (Hatch); Lake Harriet, breeding (Currie); Lake Minnetonka, breeding frequently (Hatch); Fort Snelling, spec. May 2, '89 (Fisher), Steele Co., Owatonna, breeding Apr. 29, '99 (Springer); breeding (Peabody). Waseca Co., Woodville and Goose Lake, breeding (Peabody); Woodville, several sets col. by D. A. Kinney (Jacobs *coll.*).

NORTH DAKOTA.—I am quite certain it does not breed in the woods of the prairie region, but suspect that it may do so rarely in the Turtle mountains, though I believe I have never seen it there

in summer. On July 12, '02, I found at Fish Lake, Turtle mts., a dead ad. Broad-wing hanging in a small tree. This bird had been dead so long that it was dry, but may have been breeding there. It had evidently been shot. The female I took at Rock Lake was not a breeding bird, and I have no other record that I can find of any having seen the species in summer (Bishop *ms.*). Tower Co., Rock Lake, June 4, '95, yg. female shot (Bishop *ms.*); Cando, occurs as a fairly com. migrant. I have no records of its breeding, though I have seen it in season. Specimens are hard to get as it does not stop long in open country (Judd *ms.*). Ramsey Co., Devil's Lake, May 4 and 11, '02, two adults, the former a female, by C. W. Bowman (Bishop *ms.*). Nelson Co., Stump Lake, May 1, ad. male by Alfred Eastgate (Bishop *ms.*); Talma, transient visitant, spring and fall, Apr. 4-20, and Sept. 10-Oct. 20 (Eastgate *ms.*). Griggs Co., Red Willow Lake, May 16, '02, yg. female by Alfred Eastgate (Bishop *ms.*).

SOUTH DAKOTA.—Sanborn Co., Forestburg, on two occasions, one June 6, '05, I have seen a hawk, which I took to be of this species, but was unable to secure it. My friend, Frank Patton, of Artesian, after years of thorough collecting, must still question its occurrence in Sanborn and Minor Cos. (S. E. Central) at least. He has thought that he saw it once or twice. H. E. Lee of Huron (Beadle Co.), a careful observer and collector, has not found it in his vicinity, at least up to two years ago (Visher). Hughes Co., Pierre, I have two records. One dated Mar. 25, '06, and one Apr. 12, '07. The first occurrence I am absolutely positive as to its identification, as I shot the specimen out of a large flock—for hawks—perhaps fifteen individuals, and identified it as a male Broad-wing. It was very emaciated, seemingly nothing in its stomach whatever. The one I saw last spring was some little distance away, but I am sure it was this species (Lee *ms.*).

IOWA.—I found it very plenty, never found it breeding (Krider); not uncom. from Apr. to Oct. (Keys and Williams); fairly com. on the average, being quite com. in some portions and almost lacking in others (Keys); appears to have been somewhat irregularly distributed, as far as a number of observers fail to report its occurrence, some reported it as a com. migrant, and others as rare (Anderson) Kossuth Co., W. H. Bingham reports it as com., a few breed (Anderson). Mitchell Co., spec. '80, by Dr. W. L. Abbott (Phil. Acad. Nat. Sci. Coll.). Winnebago Co., I found it com. in spring and fall, and rare in summer (Anderson); Lake Mills, breeding June 30, set of three eggs; another nest same date, a mile or so away, but the one egg broken. In late June, '07, I visited this locality and noted one individual, unquestionably a

Broad-wing, sailing leisurely above the timber (Law *ms.*); Forest City, Apr. 28, '94, saw a pair about a small grove, probably nested there a little later in the season (Anderson). Benson Grove, spec. May 15, '75, D. Hill (Phila. Acad. Nat. Sci. Coll.). Hancock Co., Silver Lake, apparently com. May 3, '83, and at various other times, as a migrant (Preston). Winneshiek and Allamakee Cos., Oniota valley, several seen between June 11 and July 10, '95, but none secured (Bartsch). Black Hawk Co., Laporte City, migrant, trans. (Cooke). Scott Co., tol. com. migrant in spring, rare in fall; spring dates and one fall record (Wilson). Poweshiek Co., trans. visit., tol. com. (Kelsey); Grinnell, migrant, trans. (Cooke). Eastern Jasper and Western Poweshiek Cos., tol. com. S. R. (Jones). Pottawatomie Co., set eggs, '92 (Trostler).

NEBRASKA.—Rather com. during the fall along the bluffs of the Missouri river (Taylor); a regular and rather com. S. R. and breeder along the Missouri and its tributaries in the eastern part, rare in the interior and a straggler in the western part (Bruner, Walcott and Swenk); used to be a rather frequent S. R. and breeder throughout the eastern portion, but it is becoming scarcer every year (Trostler *ms.*). Cuming Co., West Point (Bruner). Douglas Co., Omaha, set of 2 eggs May 15, '92; not so com. as *B. swainsoni* (White); breeding—L. Skow; rather rare, breeds in May—I. S. Trostler (Bruner); set of 2 eggs May 19, '01, in Child's Point woods, six miles south of Omaha, taken by Roy Mullen—the only nest that has come under my notice (Shoemaker *ms.*). Becoming scarcer every year, especially in Douglas and Sarpy Cos. (Trostler *ms.*). Otoe Co., Nebraska City, male shot July 17, '09 (Burnett *ms.*). Nemaha Co., Peru, spec. killed fall '88 and brought to the Laboratory of the State Normal (Taylor and Van Vleet). Lancaster Co. Lincoln, (Bruner). Antelope Co., Neleigh, four seen in the Upper Elkhorn valley, flying northward, Apr. 26, '00, and one secured (Carey). Rock Co., Long Pine, observed by Bates (Bruner, Walcott and Swenk). Sioux Co., Harrison, observed (Bruner).

MISSOURI.—S. R., breeds in all parts except the swampy S. E. counties (Widmann *ms.*). Fairly com. S. R., mainly eastward, less commonly westward. It prefers undulating ground where wooded tracts, even of medium trees, adjoin creek bottoms, wet meadows and cultivated fields. Such localities still exists in spite of the universal devastation of timber, in most parts of the State. It seems to shun the swampy southeast and the bottoms of the large rivers as well as the dry ridges of the Ozarks and the dryer stretches of the prairie region. None winter with us (Widmann). I have taken their eggs (Smith *ms.*). Cooper Co., Mt. Carmal,

Mar. 23, '85, transient—Mrs. M. Musick (Cooke). St. Louis Co., abund., migratory. Sept. 21 (Hurter). Carter Co., Grandon, nest found '07 in the valley of the Little Black river (Woodruff).

KANSAS.—Rare S. R. in eastern (Snow, Taylor). The only distinctly *eastern* hawk occurring in the Mississippi valley. It is found rarely as far west as Kas. (Cooke). S. R. in eastern part, rare, arrives about the first of Apr., leaves by the first of Nov.—at least I have not seen them later (Goss). Although I have no record of its breeding, I believe it will be found a rare S. R. in the timber bottoms (Wetmore *ms.*). A rare S. R. in eastern Kas. (Lantz). Douglas Co., Laurence, May 4, '04, female, by Leverett A. Adams; and another female May 17, '07, collector unknown—both records in the museum of the University of Kansas (Wetmore *ms.*). Shawnee Co., Topeka, migratory, rare, taken by E. U. Prentice (Snow). Montgomery Co., Independence, I observed the species in Apr., and May 6, '06, while collecting, although none were taken I am reasonably sure of the bird, as I am familiar with it (Wetmore *ms.*). Ellis Co., the most westerly record being that of Dr. Watson at Ellis (Cooke).

INDIAN TERRITORY.—Occurs during the summer months occasionally (Goss).

OKLAHOMA.—Stillwater, one shot Apr. 9, '97 (Cooke *ms.*).

ARKANSAS.—I have, so far, not run across this species in the State. It should occur in some sections in the northern part, but I have been too busy to do much field work (Smith *ms.*). I have no positive record of its appearance here during my 14 years residence at Imboden, by actually getting specimens, but I feel reasonably sure I have observed them in flight while hunting on the lower White river. Quite a number of hawks frequent our State, and I have observed Swallow-tailed and Mississippi Kites here, but never found their nests (Bacon *ms.*). Van Buren Co., Clinton (on the Little Red river—a tributary to the White river), breeds, seen Feb. 18 and June 5, '90 (Cooke *ms.*).

LOUISIANA.—It is believed that the Broad-winged Hawk is never seen in the State except during the severest winter in the middle and eastern districts (Holmes). A fairly com. resident and breeding (Beyer). S. E., pine barrens, com. S. R.; fertile district, rare if not unknown (Kopman). Long-leaved pine flats region—at a distance varying from 50 to 75 miles from the coast on slightly higher grounds—S. E., com. S. R. (Kopman). Chiefly if not entirely a S. R. and confined as a breeder to the upland region, especially pine wood sections (Beyer, Allison and Kopman). Prairie Mere Rouge, one spec. (Baird).

TEXAS.—Southern, Nueces river eastward, not uncom. In May

shot yg. bird on the Medina, and early in June found a nest with young near the Colorado river (Dresser). Western; the eastern Broad-wing has been found along wooded rivers (Bailey). Neosho Valley, during the summer months (Goss). Tyler Co., rather com. S. R., breeds, does not winter here (Pope *ms.*). Waller Co., Brazos river valley, yg. birds of *B. lineatus*, or perhaps *B. pennsylvanicus* were noticed, but none were killed (Kumlein). Houston, Harris Co., and Montgomery, Galveston and Ford Bend Cos., not uncom. during the winter months and a few remain to breed (Nehrling). Travis Co., Colorado river, I have personally observed a pair during the past two springs in a large wood on the outskirts of Austin, probably they were breeding (Montgomery *ms.*). Kendall Co., winter resident—Sept. to early spring—frequenting the heavy timber bottoms and along streams (Wentworth *ms.*). Bexar Co., found (Beckman); San Antonio, fall and winter, pretty com. Nov., seven shot during the winter (Dresser). San Patrica Co., Mission of San Patrica, Sept. (Beckman); Barton's Rancho, fall and winter (Dresser). Nueces Co., Corpus Christi, male, Mar. 14, '99 (Fleming coll.). Cameron Co., Fort Brown—Brownsville, uncom. W. R. (Merrell); spec. Apr. 9 and 12, '94, by F. B. Armstrong (Phila. Acad. Nat. Sci. Coll.); I cannot recall having taken or seen it (G. P. Smith *ms.*). Hildlago Co., Hildalgo, male shot May 7, '77 (Sennett); Lomita Ranch, not uncom. during Apr. '78. On Apr. 11, we saw 50 or more flying about over the woods. A few were taken in May. It is probable that a few remain to breed (Sennett).

MEXICO.—Lower California; Colorado delta, two or three were seen by S. N. Rhoads (Stone). Sinaloa: near Presideo de Mazatlan, by Forrer (Salvin and Godman). Jalisco: Volcan de Colima, by W. B. Richardson (Salvin and Godman). Vera Cruz: Jalapa, male collected (Ferrari-Perez); Los Vigas, two specimens secured (Chapman); Mirador, female. Sept. by Dr. Sartorius (Ridgway); Orizaba, taken by Batteri (Sclater); Coatepec, M. Trujillo (Salvin and Godman). Oaxaca: Santa Efigenia, Tehuantepec, immature, Dec. '68 (Lawrence); F. Sumichrast (Salvin and Godman).

SPANISH HONDURAS.—Occasionally met with in winter (Goss). (Salvin and Godman).

GUATAMALA.—Mr. Skinner reports its occurrence (Gentry). I have occasionally met with the birds in winter in the eastern part (Goss). Santa Rosa above Salma, and Duenas, San Geronimo (Salvin and Godman). Coban, Vera Paz, Jan. by Q. Salvin (Ridgway.)

SAN SALVADOR.—(Salvin and Godman).

NICARAGUA.—Rather com. on the Escondido during the winter months, first seen in Sept. (Richmond). La Libertad and Santa Domingo, Chontales, Leon—W. B. Richardson (Salvin and Godman).

COSTA RICA.—Coll. by A. Goering (Lawrence); ambas especies se encuentra en las alturas y desfidaderos de las montanas que circunba la altiplancia (Frantzins); breeds (Zeledon): noted during Dec. and Jan. '89-'90, one seen Apr. 20, '90 (Cherrie); spec. by Frantzius (Ridgway). The most abund. and widely spread of the migrant species of hawks, being found in the low lands of both Carribbean and Pacific and over the central plateau region. It seems quite partial to the trees along the edges of streams and isolated patches of woodland (Carriker). San Jose,—C. T. Underwood, J. Carmial (Salvin and Godman); one spec. killed in Jan. (Boucard); last of Nov. to first of May (Cherrie). Jimenez (Zeledon). Angostura.—J. Carmial; Carrillo, Barba—C. F. Underwood and San Lucas, Talamanca—Mus. Nac. Costa Rica (Salvin and Godman). Carrillo, ad. female Apr. 5, '95, and juv. female Nov. 6, '98; and Escazu, juv. males Dec. 15 and 26, '99 (Fleming coll.); also spec. in Bangs coll., by Underwood (Carriker). Rio Frio (Richmond). Guayabo, spec. by Ridgway and Zeledon, in U. S. Nat. Mus.: Cariblanco de Sarapiqui, C. H. Lankester coll.: Guapiles, El Hogar, Tucurriqui, four skins in Carnegie museum (Carriker).

PANAMA.—(Sclater and Salvin, Sharp, Lawrence); Paraiso Station—Hughes, and Volcan de Chiriqui—E. Arce (Salvin and Godman). Boquete de Chetra, Calovevora, Calobre, V. de Chwequi (Salvin). Boquete—a small village at the foot of the volcano—and Volcan de Chiriqui, 4000 to 7500 ft., two ad. and one yg., all males, Feb. 27, Mar. 10 and Apr. 19, by W. W. Brown, Jr. (Bangs); Boquiti Chiriqui, alt. 4000 ft., ad. female Apr. 25, '03, Dwight coll., and juv. female, alt. 3000 ft. Dec. 16, '04, Dwight coll. (Fleming *ms.*). Chitra, Veragua, ad. female (Riley).

VENEZUELA.—(Salvin and Godman). Caracas (Gray); individual presented by Wm. von Lawsberge to the Museum D'Histoire Naturelle des Pays-Bas (Schlegel); female (Sharp). Merida, alt. 2000 metres, ad. male Dec. 20, '03, No. 6375 Fleming coll., and ad. female Mar. ? 24, '03, No. (2) Dwight coll., and juv. male Oct. 29, '03, No. (3) Dwight coll. (Fleming *ms.*); specimen (Ihering).

UNITED STATES OF COLOMBIA.—(Schlegel, Salvin and Godman, Salvin); coll. by James McLeannan (Lawrence); winter resident, female (Barboza du Bocage). Santa Marta district, male, female ad. and female yg., winter resident (Bangs); Minca, Sierra Nevada, 2000 ft., male, Jan. 17, female Jan. 22 (Salvin and Godman);

Bonda, Nov. 13, '88 to Mar. 26, '90, and Valparaiso—alt. 5000 ft., Mar. 21, seven spec. coll. by Herbert H. Smith (Allen).

ECUADOR.—(Baird, Salvin and Godman); in winter (Dresser). Western, deux males adults, et deux jenne males, tuees a chimbo en octobre, novembre, et decembre (Berlepsch and Taczanowski). San Rafaet, deux femelle tuees en mars, col. by M. Stolzmann (Taczanowski and Berlepsch). Gualaquiza, male by H. W. Bates (Sclater). Two males from the forest of Archidona, and a female from the summit of the high forest covered Guacamayo range, which has to be covered in descending to the Napo forests after leaving Baeza (Goodfellow).

PERU.—Upper Amazon (Dresser, Salvin and Godman). Rio Javari, spec. secured by H. W. Bates (Sclater and Salvin, Sclater). Chamicuros, Peruvian Amazons, ad. male, Jan. 1, '68, and ad. female Dec. 3, '67, by E. Bartlett (Sharp); (Goeldi). Huambo, une femelle tuce le 9 Mar. '80 (Taczanowski). Maraynioc, une paire de novembre, '90, researches by M. Jean Kalinowski (Berlepsch and Stalzmann). Palcaju, female ad., Nov. '02, Dwight coll., and San Domingo Carabaya, Dept. Puna, alt. 6000 ft., female juv. Nov. 1, '02, Fleming coll. (Fleming *ms.*).

CUBA.—(Lembeye, Cabanis, Gundlach); resident (Gundlach); Dr. Gundlach informs me it is a resident species and breeds in the island, which Mr. Lembeye also confirms (Brewer); female juv. (Ridgway); Sedentario, se encuentra muchas veces in veredas y orellas de los montes (Gundlach) present (Cory). Gundlach usually found it on the border of woods along the roads that pass through them, and although the species is common, he has never found a nest; an example examined marked "male," but of the size of female, may possibly be wrongly sexed (Clark). Remedios, yg. male, June (Ridgway). Pinar del Rio Province, at San Diego de los Banos, a pair was seen, and a female shot on Apr. 7, '00, and on the 11th William Palmer shot a male at the same spot, probably mate of the former, that had remated. Previously while going up a tropical ravine in the mountains at El Guama, Mar. 21, with an Italian resident, we came upon a single bird perched in a tree, and as my companion was ahead of me, I handed him the gun to shoot, but he missed. El Guama is a valley in the mountains about four miles north of the city of Pinar del Rio. San Diego de los Banos is at the base of the chain of mountains that runs with the axis of the island in the western part (Riley *ms.*). Santiago de Cuba, Bayate, adult female, Feb. 2, 1906, and Holguin, juvenile male, Aug. 5, 1904, col. by O. Tollin (Burns *coll.*).

ISLE OF PINES.—A pair observed circling about the crown of La Tres Hermanos mountains, Nueva Gerona, Apr. 3, 1910, about 2

p. m., offering an excellent view with the field glass from the top of the mountain (Read ms.).

PORTO RICO.—Specimen (Ridgway). com. resident (Gundlach), present (Cory).

BUTEO PLATYPTERUS INSULICOLA.

ANTIGUA.—Resident, seen by Ober (Lawrence); taken (Cory): one adult male May 29, '90, coll. by Cyrus S. Winch, and three immature females, Sept. 7 (2), and Nov. 26, '03, coll. by H. G. S. Branch (Riley).

BUTEO PLATYPTERUS RIVIEREI.

DOMINICA.—Not abund., found by Ober (Lawrence); coll. by Mr. Ramage (Schlater); (Cory); very com. all over (Clark); com., widely distributed and much more tame and unsuspicious than in the U. S.; particularly com. in the vicinity of Bass-en-ville; observed from time of my arrival until departure (Verrill).

BUTEO PLATYPTERUS ANTILLARUM.

MARTINIQUE.—(Lawrence); found present by W. B. Richardson (Cory).

SANTA LUCIA.—(Allen); collected by Mr. Ramage (Sclater); (Cory).

BARBADOES.—Ligon's History shows clearly that when the greater part of the island was clothed in natural fortests, a species of Buzzard was indigenous. This may have been *B. latissimus* [=*platypterus*]. Ligon writes: "The birds of this place (setting two aside) are hardly worth the pains of description; yet in order, as I did the beasts, I will set them down. The biggest is a direct Bussard, but somewhat less than our grey Bussard in England, somewhat swifter of wing; and the only good thing they do is, sometimes to kill rats" (Fielden); (Cory); locally extinct (Clark).

ST. VINCENT.—Everywhere abundant—Ober (Lawrence); found all over the island and is very com., breeds (Lister); (Cory); very com. all over; spring of '03 a nest was found in the Botanic gardens at Kingston (Clark).

BEQUIA.—(Cory); it occurs regularly on the northern end—north of the Spring estate—where it breeds; Ober gives this bird as occurring on the Grenadines, but this must be a mistake, as excepting Bequia and Mustique, it is wholly unknown to the natives, nor could I find any trace of it (Clark).

MUSTIQUE.—Occasionally visits (Clark).

CANNOUAN.—(Cory).

CARRACOU.—(Cory); I saw one on Aug. 27, '04, near the late John Grant Wells' residence at Hermitage, but as he does not record it from that island, it must be a rare straggler there (Clark).

GRENADA.—Not abund. resident, at this time—Mar. 25—it is engaged in incubation—Ober (Lawrence); numerous, breeds (Wells); living specimen presented by Hon. Sir W. Francis Helz-Hutchinson, July 20, '91, to the Zoological Society of London (Sharp).

TOBAGO.—Collected by W. W. Brown, Jr., during Apr. and May, '92 (Cory); immature female in U. S. National Museum (Riley).

Flight.

This bird is an easy, graceful, and at times, quite rapid flyer. Buteo-like, it is fond of soaring in circles. It can move with the ease and silence of an owl. Indeed, Sennett informs us that when he shot one in a dense woods on the lower Rio Grande, he was quite surprised that it was not an owl when he picked it up. When disturbed in the timber, its flight seems heavy and sluggish. Audubon, Gentry, Preston, Blanchan and perhaps others have noticed a peculiarity of its amusement flights, which take place occasionally during migration as well as during the breeding season, which is best discribed by Gentry: "It moves in wide spiral circles, without apparently vibrating the wings. These movements are prolonged at will, and often last for a considerable time. Their object cannot be the detection of prey, which such great height would assuredly favor, as it is seldom that its apparent absorption is broken, even when its most favorite quarry comes in full view. It is purely the result of pleasurable emotions. When weary thereof, it glides earthward with a momentum truly wonderful; but just before it reaches the ground, it checks its velocity with surprising skill."

Without attempting a display of mere words, Preston's account adds something to our knowledge: "On warm summer days, this bird forsakes its ordinary flapping flight and the shadows of the woods, and indulges in a series of ærial performances befitting a bird of higher station. Suddenly, one will start up briskly from some dead tree in the forest, and begin its upward course in short circles, rising quickly and easily, by gradually widening spirals, assisting itself by vigorous flapping until well up, when the metallic scream ceases, and with full spread wings and tail it soars lightly back and

forth, still tending upward until almost out of sight, and with arrowy swiftness the gay fellow descends with long sweeps and curves, closing the act with a horizontal dash far over the woods and marshes."

A. B. Klugh, Guelph, Ontario, informs me that on September 11, 1903, he observed a flock going through a performance never before or since witnessed by him. They were sailing around at various altitudes over a large "bush." Every few minutes, one would close its wings, shoot down a sharp incline almost to the tree tops, and then swoop upwards again. As they checked their descent, they produced a tremendous noise almost like an explosion. This noise gave one the impression that he was about to be hit on the head, and it made him duck every time, even though aware of what produced it. Gentry thinks its flight recalls that of *B. lineatus,* and Saunders likens that of *Archibuteo lagopus sancti-johannis* to it, in method of execution.

Food.

The rather sedentary Broad-wing most frequently waits for its prey while perched on a convenient stub or dead limb. A slight stir below and it bends forward with dilating pupils, cat-like, with twitching tail, swaying body, light foothold; it springs forward with marvelous quickness, snatching up the object with its talons; if its captive is not too heavy, it carries it to one of its favorite perches, there to devour it unless disturbed, when it reluctantly retires after a whistled protest. Very small mammals are swallowed whole, and the larger skinned and even the leg bones clean-stripped and left attached to the hide. Birds are plucked of primaries, rectrices and a few breast feathers, flinging them aside with a quick flirt of the bill; after tearing off and devouring the head, the body is ripped open and the intestines eaten, piece by piece the limbs and body follow. Large snakes, toads and frogs are usually skinned, and smaller ones torn in sections after the head has been disposed of. Crawfish are eaten piecemeal, and insects, spiders, etc., usually disappear intact. I have seen it fly toward its nest with a mouse dangling from a single

sharp talon in its throat, and a medium-sized snake grasped firmly with both feet; yet kite-like, it will sometimes securely hold an uninjured beetle, grasshopper or earthworm, in one foot bent forward to breast, and resting on the other, delicately pick the tidbit to pieces. At times it is said to hunt on the wing, circling in the air, upon sighting its quarry it becomes stationary for an instant and then descends with considerable velocity, thrusting forward its feet with lightning-like rapidity, securely grappling its victim only when its body follows or its legs bend in the rise; unlike the Osprey which seems to have the power to clutch with extended leg, its hold is secure only upon this movement. Digestion is comparatively rapid and the indigestable parts, consisting of the nicely-cleaned bones enveloped in the hair, feathers, etc., are regurgitated in the form of pellets before fresh food is taken.

After going to considerable pains to secure most of the literature bearing on the food subject of this species, I find little of it available because much can be traced back to the often careless statements of the early writers, and some of it undoubtedly original, seems to lack authenticity. For instance, after informing us that it very rarely feeds upon small birds, one writer includes in a partial inventory of its fare, eight species of birds; a number equal to the examination of at least one hundred stomachs though he nowhere states that he examined a single one; moreover, corroborative evidence is lacking, not a single species given by him appearing in the compiled list I shall presently offer.

Dr. Fisher, who has devoted much time to the food habits of the Hawks and Owls from an economic standpoint, states in regard to this species: "Among the mammals the smaller squirrels and wood mice are the most frequently taken, though field mice and shrews also are found in the stomach contents. During August and September a considerable portion of the food consists of the larvæ of certain large moths which are common at this season, and it is the exception not to find their remains in the stomach examined. Grasshoppers, crickets and beetles are also greedily devoured. The only act which seems

to be injurious to agriculture is the killing of toads and small snakes; the former of which are exclusively insect-eaters, the latter very largely so. In one respect the enormous value ranks above all other birds, and that is the destruction of immense numbers of injurious larvæ of large moths, which most birds are either unable or disinclined to cope with."

Bristol Co., Mass. Nest of two young, three or four days old, also contained a full grown red squirrel (Carpenter *ms.*).

Godbout, Quebec.—The food of some I examined here, seem to consist of mice and small birds, and in one case I found remnants of the Northern Hare, but I do not think it kills them regularly, it was probably found dead.—(Comeau *ms.*).

Ottawa, Ont.—Those that I examined apparently fed on insects, small mammals, snakes and frogs. In fact it appears to be very fond of small wood frogs and grasshoppers. A favorite locality is a cedar swamp where there are lots of frogs and garter snakes.—(White *ms.*).

Portage la Prairie, Manitoba.—While with us it feeds upon mice and small rodents, I never had any complaints of its interfering with poultry and never found bird remains in its stomach.—(Atkinson *ms.*).

Norwich, Conn.—Chipmunks, red-squirrels and snakes.—(Richard *ms.*).

York Co., Pa.—On May 1, 1904, I was much surprised to see one swoop down, sieze and carry off a red squirrel from the middle of the road, not more than thirty feet ahead of me. It then flew to a tree some hundred yards away, where I watched it through my field glass, tear and devour the animal.—(Wisler *ms.*).

"Seldom committing depredations in the poultry yard and rarely killing a small bird of any kind."—(Keys).

"Never have I known them to molest poultry."—(Preston).

"There were never any signs about the nest that birds or poultry formed part of the food of the young—(Burroughs).

"Rarely kills birds and is distinctly a benefit to the agricultural interests."—(Roberts).

"It does little or no harm to poultry and but little to birds, except in the breeding season when it has young to feed, when it occasionally catches some of the smaller birds."—(Riley).

"Blacksburg, Va.—Principally mice, insects, frogs, etc., and occasionally small birds."—(Smyth).

"Howard Co., Md.—This morning, Dec. 30, 1889, my son, Mr. J. Murry Ellzey, surprised and shot a Broad-wing which had seized near the house a large Plymouth Rock rooster, which he had lacerated and almost denuded of feathers along the back, and certainly would have killed but for timely rescue, in a very few minutes. This is the second instance this season in which Mr. Ellzey has shot this species in the act of seizing poultry. At West River, some weeks ago, it appeared in greater numbers than ever before remembered and numerous complaints of its attacks upon poultry were made."—(Ellzey.

Doubtless there are a few individuals in a hundred thousand of this species, possessing the strength and spirit, and at some period sufficiently near starvation, to attack and kill a fowl many times its own weight, but the evidence here presented would scarcely convict. I know of several pairs nesting within sight almost, of several thousand domestic fowls, and in the twenty-two years I have known the species as a local breeder, never heard of it molesting poultry in any way. Prof. Ellison A. Smyth, Jr., of Blacksburg, Va., informs me that on May 18, 1906, a farmer brought him an incubating female and said it had a nest near his house. His wife claimed it was killing her chickens, so he shot it. Its stomach contained part of a young rat. Wm. B. Crispin, Salem, N. J., says it never molests poultry.

Samuels writes of an individual missing a red squirrel, then dash at and kill a white-throated sparrow—a feat worthy of one of the *Accipiters*; and Maynard relates at some length the movements of one which had killed and eaten an adult Brown Thrasher. Maynard was better acquainted with the species than Samuels, whom I suspect of not infrequently confusing his birds. I have an immature bird which was shot as it dashed in the midst of a flock of Red-winged Black-

birds; its stomach, however, contained grasshoppers and fiddler crabs. In a nest deserted by the lusty young, July 10, 1900, I found pellets and other evidence of the forbidden food: (1) hair, skin and jaw of wood mouse, interscapulars of a young Flicker, (2) feathers of a young Wood Thrush; the nests also contained the rectrices of one or two young Flickers. Dr. Mearns found no trace of feathers or other evidence of its feeding upon birds in the numerous specimens dissected. Banks found three unfledged Thrushes in a specimen taken in New Brunswick, and Swift a small bird too decomposed to identity, in an Elmira, N. Y., bird. Chas. C. Richards of Norwich Conn., notes that the Blue Jay, Oven-bird and other small birds do not mind this species in the least, and sometimes nest almost under the tree occupied by it, but never so near the *Accipiters*.

(*Buteo platypterus antillarum*), Grenada, W. I. "Lizards, rats, snakes, young birds, etc., and occasionally makes a raid on the poultry yard."—(Wells.)

St. Vincent, W. I. "In the stomachs of all specimens I examined I found the remains of lizards and snakes. The name by which this bird is known throughout the island (Chicken Hawk) led me to suppose that it was an enemy to chickens. I never observed it molesting poultry. A female was feeding on one of the enormous earth-worms common in those parts."—(Lister.)

(*B. p. rivieri*), Dominica, W. I. "Eats lizards as well as small birds."—(Ober.)

"In several of the specimens taken, the stomach contained nothing but large caterpillars."—(Clark.)

Returning to *B. p. platypterus*, Henshaw states that its bill of fare includes snakes, toads and frogs, but not many mice and very few birds of any sort; and Allen found portions of two or three garter snakes in a nest containing two young ready to fly on July 22, 1898, in New Hampshire. J. H. Fleming informs me that one of the nesting birds of Emsdale, Ont., had a large garter snake on May 18, 1897; and Chas. C. Richards writes that in going to a patch of

woods in Ledyard, Conn., Apr. 28, he saw a Broad-wing sitting on a dead limb overlooking huckleberry pasture and cultivated land. It was looking intently at something in the bushes, which proved to be a blacksnake at least five feet long. Doubtless the bird was waiting for the reptile to get clear of the bushes before tackling it. McIlwraith states that near the end of April or early May, it may be met with in the woods of Southern Ontario, usually sitting quietly on the lower branch of a tree near some wet place, watching for frogs; Bagg finds it in like situations on the shores of the little lakes of the Adirondack region, feeding to a considerable extent on frogs; one killed had two pairs of frogs legs in its stomach; and Sage states that all specimens examined at Portland, Conn., show that it feeds upon frogs.

The male apparently carries food to the sitting female. Henry W. Beers observed at Trumbull, Conn., May 12, 1903, a male perched near a nest with three eggs, with a fish in his claws; and John L. Calcord, New Vineyard, Me., flushed a female from her nest and eggs, May 30, 1905; the male came about carrying a wood mouse in his claws. F. B. Spauldings, Lancaster, N. H., May 13, 1898, found a nest of fresh eggs containing a dead snake about a foot long.

"It is fond of the larvæ (or caterpillars) of the big night-flying moths."—(Henshaw.)

"Have examined the stomachs of a good many and found principally catepillars and grasshoppers."—(Kumlien.)

"In July, 1882, my nephew, Malcolm Storer, being at Moosehead lake, (Maine), had the curiosity to examine the stomach of a (Broad-winged) Hawk he had shot there, and was surprised to find that it contained a large number of catepillars in all stages of decomposition through digestion. They were of greenish color, with yellowish ring or blotches, and were as thick and almost as long as a man's little finger."—(Storer).

"Minea, Sierra Nevada of Santa Marta, Venezuela. Stomach of specimens taken Jan. 17 and 22, 1879, were full

of large grasshoppers, spiders, etc."—(Slavin and Godman.)

"Western Ecuador. Dans l'estomac des chenille de lepidoptre, et des morceaux de blatte."—(Berlepsch and Taczanowski.)

"Gualequiza, Ecuador, male, fish scales, locusts, beetles and frogs."—(Sclater.)

"Making a specialty of the large caterpillars of the sphinx-emperor moths, such as the cecropia caterpillars so destructive to shade trees. This is one of the few birds that venture to attack these formidable-looking creatures."—(Weed and Dearborn.)

The young are well cared for and fed with insects or small bits of flesh soon after leaving the shell. F. H. Carpenter found a full grown red squirrel in a nest of small young, Bristol Co., Mass., June 14, 1901; and my own notes read as follows: June 10, 1906, freshly killed meadow mouse, and small pellet of mouse hair; young 8 days old. July 2, 1907, frequent pellets the size of the end of my thumb, of mouse hair and some bones; also bits of crawfish and a decayed wood mouse under several layers of leaves; young 22 days old. July 1, 1906, no pellets but numerous tufts of mouse hair; young 29 days old. July 23, 1901, large ground mole freshly killed, young 41 days old.

"The stomachs of four birds examined, one had just eaten a part of a rabbit, one a red squirrel, one a snake, and the crop of the fourth was filled with bones of young birds taken from the nest. I have several times seen this hawk catching grasshoppers, but never a mouse."—(Hardy.)

Clark says: "This hawk [*Buteo platypterus antillarum*] is a great plague to poultry raisers on St. Vincent, but on the other hand it is of use to the agriculturist, as it feeds largely on the mole-cricket, which, since the introduction of the mongoose and the consequent killing off of the large ground lizards, have increased to an alarming extent. I once took 18 of these insects from the stomach and crop of a single hawk."

RESULTS OF THE EXAMINATION OF TWENTY-ONE STOMACHS.

Linda, Minn., June 3, '93, female, sm. garter snake and bunch of hair, Benj. T. Gault.

Mt. Ephraim, N. J., May 12, '01, female, sparrow, phoebe, fledgling size of robin, Anna A. Mickle.

Raleigh, N. C., August 26, '89, male, 1 beetle, 1 green grasshopper, C. S. Brimley.

Raleigh, N. C., May 23, '88, female, mouse fur, C. S. Brimley.

Raleigh, N. C., May 23, '88, female, remains of crawfish, C. S. Brimley.

Troy, Ohio, April 27, '07, male, 2 toads, G. Clyde Fisher.

Wayne Co., Mich., April 23, '99, female, 3 sm. garter snakes, and beetles, J. Claire Wood.

Wayne Co., Mich., April 30, '99, female juv., 3 beetles, 1 crawfish, parts of mouse, J. Claire Wood.

Wayne Co., Mich., May 5, '07, female, 1 sm. garter snake, 1 hyla, 1 crawfish, J. Claire Wood.

Wayne Co., Mich., May 19, '07, male juv., 1 crawfish, J. Claire Wood.

Wayne Co., Mich., May 19, '07, female, 2 green frogs, J. Claire Wood.

Wayne Co., Mich., May 26, '07, male, parts of warbler, J. Claire Wood.

Blacksburg, Va., May 18, '06, female, parts of young rat, Ellison A. Smyth, Jr.

Ottawa, Ont., May 8, '09, male, large beetles, G. Eifrig.

Berwyn, Pa., September 1, '91, female, large green caterpiller, mouse hair, F. L. Burns.

Bradford Hills, Pa., April 16, '94, female, large bull frog, F. L. Burns.

Berwyn, Pa., Apr. 27, '05, female, field mouse, bull frog, F. L. Burns.

Salem, N. J., August 9, '05, male im., remains fiddler crab, 1 red-legged and 1 leather-backed locust, F. L. Burns.

Paoli, Pa., October 5, '06, female, May beetle larvæ, 3 red-l. locusts, F. L. Burns.

Berwyn, Pa., April 23, '09, female, 1 thousand-legs, F. L. Burns.

Defuniak Springs, Fla., June 23, '10, male, 2 or 3 grasshoppers and 1 katydid, G. Clyde Fisher.

Summary: Langdon, Warren, Fisher, Burns, et al. 115 stomachs examined; 11, contained birds; 31, mice; 17, other mammals; 17, reptiles; 22, batrachians; 45, insects; 10, crawfish; 2, spiders; 1, thousand-legs; 2, earth worms; and 7 were

empty. The Broad-winged Hawk has been known to have eaten the following species:

Lepus floridanus Cottontail Rabbit,, (Fisher), *Lepus americanus* Northern Hare, (Nap. A. Comeau), *Microtus pennsylvanicus* Common Meadow Mouse, *Microtus pinctorum* Short-tailed Meadow Mouse, *Evotomys gapperi* Red-backed Mouse, *Peromyscus leucopus* White-footed Mouse, *Mus musculus* House Mouse, *Mus norvegicus* Norway Rat, *Arvicola austerus* Wood Mouse (Langdon), *Tamias striatus* Chipmunk, *Sciurus hudsonius* Red Squirrel, *Blarina brevicanda* Short-tailed Shrew, *Blarina brevicanda carolinensis* (Fisher), *Putoris noveboracensis* Common Weasel, (Keys), *Colaptes auratus luteus* Northern Flicker, (Burns), *Sayornis phœbe*, Phœbe (Anna A. Mickle), *Zonotrichia albicollis* White-throated Sparrow, (Samuels), *Passer domesticus* English Sparrow, ("C. C. F."),*Sciurus aurocapillus* Oven-bird, (Fisher), *Toxostoma rufum* Brown Thrasher, (Maynard), *Turdus mustelinus* Wood Thrush, (Burns), *Enmeces sp.?* Lizard (Langdon), *Thamnophis sirtalis* Garter Snake, *Storeria occipitomaculata* Red-bellied Snake (Fisher), *Liopeltis vernalis* Grass Snake, *Natrix sipedon* Water Snake, *Bufo lentiginosus americana* Common Toad, *Rana clamita* Green Frog,*Rana pipiens* Leopard Frog, *Rana sylvatica* Wood Frog, *Hyla sp.?* Tree Toad (J. Claire Wood), *Ceratomia amyntor* Elm Spinx larvæ (Fisher), *Samia cecropia* Cecropian Moth larvæ (Fisher), *Telea polyphemus* larvæ Polyphemus Moth (Fisher), *Lachnostuna fusca* Bay Beetle larvæ Polyphemus Moth (Fisher), *Lachnostuna fusca* May Beetle (King), *Tibicen septendecim* Seventeen-year Cicada (Fisher), *Melanoplus fermur-rubrum* Red-legged Locust (Burns), *M. bivittalus* Two Striped Locust, *M. atlantis* Lesser Migratory Locust, Leather-backed Grasshopper (Burns), Thousand-legs (Burns), Black Spider, Dragon Fly, Black Ant (Case), Fiddler Crab (Burns), *Astacus fluviatilis* Crayfish, *Sitones hispidulus* Clover-root Curculis (McAtee), *Lumbricus terrestris* Earthworm.

Voice.

This species is one of the most musical of its tribe. Its characteristic notes have been variously, though not always satisfactorily described. It may be that it is somewhat different in the various localities and that individuality occurs in some instances, or perhaps we do not all hear alike, at any rate the numerous interpretotions are at variance. Samuels gives it as a shrill *"Key, ky-ah, Ky-ah-Ke-ee."* To Gentry it sounds like *"Ke-ou."* Reed, *"Cree-ee,"* Job, a shrill

scream *"Whee-e-e."* Blanchan, *"Che-e-e-e."* Preston likens it to the Killdeer Plover and tolerably well represented by the syllables *"Chee-e-e-e,"* sharp and piercing when the bird is angry or drawling and pitiful when an intruder comes too near the nest. Frequently he had almost decided to leave the humble parent in possession of her treasures, so pleading was she, and her attitude so indicative of sorrow. Jackson likens its voice to the grating of a large door on its hinges, and Reed to the creaking of branches. Abbott decribes it as a rather prolonged, mellow whistle that is pleasing and very different from the cat-like scream of the Red-tail; Minot who was not very familiar with the species, thinks it not unlike the familiar cries of the "Hen Hawks." Burroughs calls it the smoothest, most ear-piercing note he knows of in the woods. Mearns calls it a squealing note.

In Minnesota it sounds like *"Siggee, siggee,"* something like a Killdeer, a Rose-breasted Grosbeak or the alarm cry of a Red–winged Blackbird to Currie; while Peobody hears a shrill shriek of *"Tig-g-e-e-e tig-g-e-e-e"* that stirs his blood. Widmann describes it as a piercing *"Ré ee,"* and it sounds almost exactly like the whistle of the Killdeer to Ralph, which agrees with the description given by Riley *"Kill-e-e-e."* According to the latter's experience this cry is never given in a hurry or in quick succession. It might with propriety be called the nest call, as he has never heard it except in the vicinity of a nest. White also favors the Killdeer note. Wintle heard it utter a note very much like a Cowbird. The manuscript notes are almost as widely at variance. A. C. Bent describes the bird whistling her characteristic note, so different from that of any other hawk *"Kwee-e e e e,"* a shrill whistle on a high key, long drawn out, plaintive and diminishing in force. The Red-shouldered occasionally utters a somewhat similar note, but on a lower key and not so prolonged. He also heard a *"Ker-weee e e e e"* uttered by a bird sailing over the tree tops. Henry W. Beers and Harry S. Hathaway think squealing describes its notes better than whistling, and the latter has heard the East

Greenwich, R. I., birds give the Killdeer Plover call several times; he describes the usual cry as "*K-a-nee.*" Prof. Ellison A. Smyth aptly terms it a whining whistle. The Rev. P. B. Peabody lately describes it as "*T'-e-e'-e-e.*" This note is often heard while the bird is on the wing, which gives the note, under this circumstance, a softened ringing timbre.

The Florida bird utters a shrill "*Chip-pee*" with pronounced accent on last syllable, according to R. W. Williams. It has also a subdued note that is so accurately reproduced by the Florida Blue Jay, that one is often mistaken for the other until the bird is seen. E. F. Pope of Colmesneil, Texas, says it has a habit of circling high overhead and uttering its rather plaintive note of "*Zigee-e.*" John E. Thayer calls its cry Phoebe-like. Dr. Fisher tells us that one of its notes resembles quite closely that of the Wood Pewee. I have noticed the similarity, however, the first syllables are not alike and the whole lacks the penetration in the instance of the last named species. With the Broad-wing it is a subdued and plaintive "*Che-wee*" or "*Che-wee-e-e.*" When mating or locating for the season, it lazily skims through the air just above the tree tops, uttering a frequent metallic "*Che-e-e,*" which, unlike the former and more domestic note, is perhaps not wholly a whistle nor more than a suggestion of a scream. Once when a captive was harried by a band of Grackles, and again when a female was disturbed repeatedly at its nest containing small young, I heard it utter a peculiar harsh distressed cry "Ka-Ka-Ka-*Ka.*" Owen Durfee once only, detected a difference in the notes of the sexes. May 21, 1904, at Lancaster, N. H., that of the female presumably, being more raucous, and that of the male more shrill. I have noticed it in a pair found nesting May 12, 1907, near Berwyn. The female flushed from the nest and perched in a nearby tree, the male soon appeared from an opposite direction and his "*Che-wee-e-e-e*" was answered in ten seconds by the female on the near side of the ravine; if she failed to reply in the allotted time, he waited ten seconds longer and whistled again, and she replied after about the

usual interval; a single whistle sufficed, it was not repeated until after the regular period. The whistle of the male was an octave higher always. The female loomed up large and light in the clear sunlight, without leaves to obstruct the view, as I passed almost directly under her.

Chas. C. Richards likens it to the Wood Pewee's last syllable, longer drawn out, tone between Wood Pewee and Killdeer. He has heard its note when it sounded almost exactly like a young Beetle-head's (Black-breasted Plover), as it came back to decoy after one of the flock had been winged. In one instance where the second egg was very small and doubtless the bird aged, it had a cracked whistle on the last of the note. Full note "*Peeo-we-e-e-e.*" Male different from female. Knight gives it as a shrill whistled "*Ku-e-e-e.*" It is worthy of note that Dr. Coues found the young captive Swainson's Hawks, a closely related species, uttering a "peculiarly plaintive whistle to signify hunger or a sense of loneliness, a note that was almost musical in its intonation. The old birds have a harsh scream," and the Verrills state that the note of their newly described *Buteo tropilis* Tropical Buzzard of San Domingo, resembles that of *B. platypterus*. Ober states that the Dominican form of Broad-wing, *B. p. rivieriei*, courses above the valley uttering its cry of "*mal fini fini.*"

Enemies.

Man is the chief, and it may be said with almost equal truth, the only deadly enemy with which the Broad-winged Hawk has to contend. Some years ago I noticed a fine specimen nailed in the prevailing spread-eagle fashion to a barn door at Paulding's bridge, within a stone's throw of the Bakewell estate where Audubon captured his first example. I thought that if this was a lineal descendant of that historic bird, inheriting a portion of its peculiar disposition, the hunter responsible for this one's death had no great reason to feel proud of either his markmanship or woodcraft.

Every person possessing a gun seems to take a peculiar delight in persecuting this and all other species of the *Rap-*

torcs. Truman Yarnall, a sporting Quaker of Willistown, Chester Co., Pa., made the killing of hawks an especial hobby. His method was simply to ride up within short rifle shot, which he could easily do on horseback; dismount, pass his arm through the reins and adjust the sight—about this time his horse would toss his head, anticipating the report of the gun, usually eliciting an impatient "I do wish thee would be quiet!" from his master. I am informed that he killed 130 hawks in a single winter. Lancaster County, Pa., is agricultural to a fault, and J. Jay Wisler writes that the Raptories have a rough time of it; ornithologists, who might spread the gospel of protection, being few. J. Claire Wood reports that the local hunters of Port Austin Twp., Huron Co., Mich., spoke of having shot hundreds for sport in the annual spring flight; and at Point Pelee, Ont., a farmer sat in his front yard one afternoon and shot 56 without leaving his chair! (Taverner and Swales).

But from northern New Jersey come the most shocking reports of slaughter: "The sportsman who this season (1900) has done the greatest execution is J. Elmer Applegate, and he it was who expressed to 318 Broadway such a bunch of hawks as was probably never seen in this city before. So unique was the display that the birds were strung upon a line and hung outside of the show window facing Broadway, where, suspended by the heads in a festoon the birds attracted an enormous amount of attention from passing pedestrians." "A flight very much in evidence on April 16. As usual Gil Spear was there to meet them, and he and two of his friends shot close to a hundred during the two days occupied in the passage." Again, "J. P.," writing for Shooting and Fishing, XXIV-XXVIII, 1898-1900, states that Hank White and William Little shot fifty the first day, and the next day when the main flight came along, the former and Howard Hance "killed 298 in all from largest to smallest." C. H. Muirhead of South Amboy, writing for the same journal, states, "I remember after a morning's shooting at Dad Applegate's several years ago, we counted

more than six hundred dead hawks, and there were many more killed on the other side of the creek that were not counted."

Dr. Shufeldt, in commenting on the above, says: "People entertain terribly mistaken ideas about the part hawks—and owls too, play in nature. A great many farmers have a notion that there are but two kinds of hawks, a big chicken hawk and a little chicken hawk, both of which menace their prosperity by attacks upon the poultry yard. * * Greedy men! Doubly greedy farmer! * * It is said, and with truth, that they prey upon our smaller game birds—yes, and always to satisfy the instincts of hunger, and never simply for the sport of the thing, as men do all over the world."

Not content with the constant unorganized slaughter, many of our state legislatures have passed bounty laws from time to time in recognition of the supposed interests of the rural population. Rhode Island has been swept bare of breeding Broad-wings owing to recent "scalp act" and to the destruction of timber. Near Toronto, Ont., it seems to be decreasing, one woods usually inhabited, suffered badly from last year's fire and the ax (Eifrig ms.) In the vicinity of Tallahassee, Fla., it invites its own destruction in a manner which is characteristic of the species. Just as soon as one enters its haunts it sets up its shrill cry. It is only a matter of locating the nest-tree within the circumscribed area the bird has marked out (Williams ms). Owing to the female's solicitude for its nest during the breeding season, it falls victim much oftener than the male. I believe most collections will show a marked excess of the former over the latter.

Disposition in the Presence of Other Birds.

It is not quarrelsome: as a rule it will dwell in peace with its neighbors. I have found crows nesting all around it in perfect harmony apparently; and was once almost mobbed, myself, while robbing a Broad-wing's nest, by a party of Fish Crows. Its comparative immunity from attacks of the semi-domesticated species, is doubtless due to its habit of confining

its operations within its natural bailiwick—the timber, swamp, and waste places. The few instances of disagreements that have come under my observation, are appended.

In common with the Buzzards, it is often teased by Kingbirds and Crows, but on such occasions shows a quiet dignity and unconcern, which is very striking."—Minot.

"It seldom pursues other birds of prey, but is itself frequently teased by the little Sparrow Hawk, the King-bird or the Martin."—Holmes.

"Though usually a sluggish bird, it will at times show considerable courage and dash at an intruder. I have noticed two such instances. Once while in a tree watching a Swallow-tailed Kite, a male Broad-wing Hawk which was guarding a nest, fought another bird of this species, driving and pursuing it a great distance. Then suddenly it turned back and almost struck me in the face as it came on with arrow-like swiftness."—Preston.

Wilson lost the mate to the one he shot, because it was attacked and driven away by a Kingbird. R. P. Sharples writes me of a pair near West Chester, Pa., found in the same woods for a number of years until 1907, when they were driven out by a pair of Cooper's Hawks, nesting in the next ravine. I have found the *Accipiter* and the *Buteo* dwelling amicably in the same neighborhood. A. C. Bent found the Crows making life miserable for a nesting bird, at one time three chased her; and on the other hand a nest found May 17, '08, at Rehoboth, Mass., was hardly 100 yards from that of a Cooper's Hawk, and there was also a Red-shouldered Hawk's nest within a quarter of a mile; showing that the three species can live in harmony as near neighbors.

John D. Currie found it nesting in close proximity to the Cooper's Hawk, American Crow, Long-eared Owl and Black-crowned Night Heron. At Chester, Ct., J. B. Canfield found its nest within 100 feet of the domicile of a Sharp-shin; and Chas. C. Richards, Norwich, Ct., relates an instance of a pair of Broad-wings actually assisting a nesting Red-shoulder in her endeavors to scare the intruder from her nest.

Disposition in the Presence of Man.

Wilson, who secured the type specimen in Bartram's own woods, had little opportunity to study the bird's natural temperament. His specimen was secured but a short time before Audubon had taken the same species from a nest a few miles further up the Schuylkill. The former figured the male life size in a spirited attitude for his sixth volume of American Ornithology which appeared in 1812, while the latter drew the female early the same year; each unmindful of the other's greeat work in Nature's realm. In the exact language of Wilson: "It was perched on the dead limb of a high tree, feeding on something, which was afterwards found to be the meadow mouse, figured on Plate L. On my approach, it uttered a whining kind of whistle, and flew off to another tree, where I followed and shot it. . . . It seemed a remarkably strong built bird, handsomely marked, and was altogether unknown to me. Mr Bartram who examined it very attentively, declared he had never before seen such a hawk. On the afternoon of the next day, I observed another, probably its mate or companion, and certainly one of the same species, sailing about over the same woods . . . I was extremely anxious to procure this also, if possible; but it was attacked and driven away by the Kingbird before I could effect my purpose, and I have never since been fortunate to meet with another." The date was May 6th, 1812. Audubon's account, though verbose, is full of interest: "One fine May morning, when nature seemed to be enchanted at the sight of her own great works, when the pearly dewdrops were yet hanging at the point of each leaf, or lay nursed in the blossoms gently rocked, as it were by the soft breezes of the early summer, I took my gun, and, accompanied by my excellent brother-in-law, William G. Bakewell, Esq., at that time a youth, walked toward some lovely groves, where many songsters attracted our attention by their joyous melodies. The woods were all alive with the richest variety, and, divided in choice; we kept on going without shooting at anything, so great was our admiration of every bird that presented itself to our view. As we crossed a narrow skirt of woods, my young companion

spied a nest on a tree of moderate height, and, as my eye reached it, we both perceived that the parent bird was sitting on it. Some little consultation took place, as neither of us could determine whether it was a Crow's or a Hawk's nest, and it was resolved that my young friend should climb the tree, and bring down one of the eggs. On reaching the nest, he said the bird, which still remained quiet, was a Hawk and unable to fly. I desired him to cover it with his handkerchief, try to secure it, and bring it down together with the eggs. All this was accomplished without the least difficulty. I looked at it with indescribable pleasure, as I saw it was new to me, and then felt vexed that it was not of a more spirited nature, as it had not defended itself or its eggs. It lay quietly in the handkerchief, and I carried it home to my father-in-law's, showed it to the family, and went to my room, where I instantly began drawing it. The drawing which I then made is at this moment before me, and is dated 'Fatland Ford, Pennsylvania, May 27, 1812.' I put the bird on a stick made fast to my table. It merely moved its feet to grasp the stick, and stood erect, but raised its feathers, and drew in its neck on its shoulders. I passed my hand over it to smooth its feathers by gentle pressure. It moved not. The plumage remained as I wished it. Its eye, directed toward mine, appeared truly sorrowful. I measured the length of its bill with the compass, began my outlines, continued measuring part after part as I went on, and finished the drawing without the bird ever moving once. My wife sat at my side, reading to me at intervals, but our conversation had frequent reference to the singularity of the incident. The drawing being finished, I raised the window, laid hold of the poor bird, and launched it into the air, where it sailed off until out of my sight, without uttering a single cry, or deviating from its course."

Incredible as Audubon's account may seem to many, due allowance being made for the embroidery of retrospection, it is no doubt true in the main. There are times when individuals of the most timid or the most wary species may be approached and handled, especially during the most critical period

of incubation. Nor is his experience altogether unique; I have perfectly authentic evidence of a similar instance in recent years. I regret that my correspondent has withdrawn its publication at this time.

"I have always found it cowardly, and to evince no disposition to repel an invasion of its nest. It would seem, however, that the disposition of this bird under certain circumstances is very variable. Mr. A. G. Boardman, of Maine, who has found several nests, and secured the eggs, finds it to be couragous and spirited. A man whom he had employed to obtain a nest, was attacked with great fury, while ascending the tree; his cap was torn from his head, and he would have been seriously injured if the bird had not been shot. Another instance is mentioned by Dr. Wood, where the hawk had attacked a boy climbing to her nest, fastened her talons in his arm and could not be removed until beaten off and killed with a club."—Warren.

"Last summer, when in company with the Bangs brothers at Tyngsborough, I noticed a small hawk perched on top of a dead stub in a wood. While I was endeavoring to obtain a shot, it flew a short distance, alighting in a spot where I could not see it, but I continued to walk in the direction it took and, after going as far as I thought it had flown, stopped to examine the branches of the trees, when I was surprised to see the object of my search, sitting on a low limb a few yards away, gazing quietly at me."—Maynard.

"They are gentle in disposition and never attempt to strike a person, although they are very solicitous about their eggs and young. For days after they have been robbed, these birds will utter their complaints when anyone approaches their homes."—Ralph in Bendire's Life Histories.

"One day while stationed in a tall larch [N. W. Minn.] watching a pair of Swallow-tailed Kites which were nesting not far away, a Broad-wing seemed much disturbed at my presence. Perching himself on top of a dry larch, within easy gunshot of me, he kept up a continual cry, screaming forth his shrill *e e e*. Now and again he darted by me so close as to fan me with his wings; then he resumed the same perch where

he poured forth his doleful strain. This was the first attempt at resistance I had witnessed, as when frightened from the nest, the female will fly heavily away a little distance and remain among the tree tops, an anxious witness of the collector's depredations."—Preston.

"The collector does not have to reconnoiter around two or three hundred yards to get a shot at a Broad-wing, but can walk deliberately up to within easy range and collect his bird. Last summer, one allowed me to approach so near him that I killed it with a stone from a 'sling.' They are beyond doubt the least suspicious of any of our hawks."—Cantwell.

Edward J. Kimes, Canton, Ohio, relates another instance of the consuming curiosity of the bird. On Mar. 27, 1910, when it was approached along the edge of a wood in the hope of a nearer view, it flew slowly out and above him at the height of the tree tops and then leisurely back again, alighting face about and scrutinized him closely, this was repeated three or four times.

At Middletown Springs, Vermont, during the autumnal flight of 1904, one was caught on a fence close to a house. The people watching, unintentionally attracted its attention while a boy crawled along the fence and grasped it by the legs. This sounds unreasonable, but never-the-less it is a fact told me by the boy and by his father who saw him do it; both are well known to me and reliable. I saw the hawk, which showed no signs of having been kept in captivity. It never became at all tame and was given its liberty before winter.—W. S. Hickox *ms.*

Philo, Ill. A boy brought me one which he says allowed him to knock it off a limb with a ten foot stick. Last year I kept a wounded one captive until his wound healed. He became a model pet and when a week after I released him in Lynn Grove, he allowed me to catch him again, I felt that he had not forgotten me.—Isaac E. Hess *ms.*

In North Carolina it is a little tamer than the other *Buteos*, C. S. Brimley *ms.*; and at Tallahassee, Florida, it appears

timid and spiritless, yet it selects a nesting site in the close vicinity of man.—R. W. Williams, Jr., *ms.*

At Gualaquiza, Ecuador, Sclater registers it as exceedingly shy; while Lister found the form now known as *B. p. antillarum*, at St. Vincent, West Indies, very bold in defense of its young and unlike the Black Hawk, very tame and permits a near approach.

We may call the species tame, stupid, cowardly, spiritless, anything that may seem to imply lack of energy, courage or enterprise; but nevertheless it has retained its independence of man, and as man's hand has cut off its more enterprising competitors, it has quietly filled their places without attracting attention by dashing boldness nor injurious habits.

Disposition in Captivity.

"In the spring of 1871, a nest was built in the woods adjoining my house, from which I took one of the young birds. It became a very interesting pet, quite gentle, and fond of me, but refused to submit to being handled by anyone else; but it was prone to wander abroad, and so was lost."—Mearns.

"Unlike *lineatus*, it is a very disagreeable and surly pet, indignantly refusing proffered food. It maintains the unenviable disposition for nearly a week, when being sorely pressed by hunger, and seemingly convinced that escape is hopeless, it ultimately becomes reconciled to its condition, and learns to come at the call of its master, and even to accept food from his hands. In the presence of strangers, it manifests marked reticence, and instantly repels any attempted familiarity."—Gentry.

"Side by side with *Accipiter cooperi* I reared a *Buteo pennsylvanicus* of about the same age (probably two weeks). The fierce aspect of the *Accipiter* showed itself quite early, and indicated by its every action, its rapacity and daring. The *Buteo*, on the other hand, was mild in appearance and never exhibited the fierceness nor voracity of the *Accipiter*. But I succeeded better in petting the latter. It seemed to grow rapidly fond of my company. The *Buteo*, however, neither ex-

pressed pleasure, nor showed displeasure upon my coming near it, though it would make itself felt when one attempted to handle it. It never, however, used its claws with the same spirit as the *Accipiter*. I could handle the latter with impunity after it grew to know me. Strangers, it fought with spirit and resisted all their attempts at familiarity. The *Buteo* regarded all alike, seemingly neither as friends nor foes."—Roddy.

"A trio of fledglings, which came into my possession, devoured almost everything offered them, even cooked beef. It was really amusing to watch them. One, who was the strongest, asserted his powers by gathering everything to himself, at which he was kept very busy, as his weaker nest-mates would slyly purloin a portion, even at the risk of a flap over the head. They were always quarrelsome and never satisfied."—Preston.

"They were very noisy and resented being handled very much, though among themselves, good nature prevailed." (Three young 3–4 weeks old.)—Shufeldt.

We kept a family of four young for two weeks or until three had disappeared one at a time down the throat of the largest. He was a regular cannibal—Isaac E. Hess *ms*.

Some ten years ago we took one from a nest and kept it several years in a cage in the yard (winter in the basement.) It was not at all wild when one approached the cage and took food out of one's hand. It knew all those that belonged to the house. When a stranger entered the yard it always uttered its "*peeee*," but never when one of the family entered. It was as good as a watch dog and was particularly loud when a begger came sneaking around the house into the back yard when he had to pass his cage to go to the kitchen door.—O. Widmann *ms*.

My first captive was a female raised from the nest. I had named it "Buteo." When three months old I considered it quite as able to take care of itself as if it had the teachings of the parent. At this age it frequently uttered the single syllabled "flight" cry, harsher at the end, and which I interpreted as the hunger cry, as it was perched upon or just above the feed-

Broad-winged Hawk (*Buteo platypterus*)
Juvenile "fluffed out" to resist cold wind. Nov. 30, 1907
(Photographed by Alfred C. Redfield)

ing board, evidently waiting to be fed. The fat of beef, or mutton was invariably rejected, beef liver and lights, toads, fish, the body of an owl, and tainted meat were not to its liking unless it was very hungery. Large, fat, corn-fed meadow mice and fresh, warm sparrows appeared the favorite food, though any species of mouse or mole, rat, skunk, rabbit, squirrel, kitten, puppy. chicken, snakes, frog, lizard, turtle, crayfish, insect, and scraps of raw beef were eaten eagerly Live food was preferable to dead food, always; and anything larger than a young rat usually had to be slit up the breast to enable it to get at the flesh. In all the years I kept this and others captives, not a drop of water was consumed directly. This bird would occasionally hop awkwardly about the ground snapping at flies and bugs. Two or three meals daily, after it had attained its growth, seemed to keep it in good condition If a meal was occasionally dropped, it would often be hungry enough to blanket the first few morsels, from which I infer that this action relates more intimately to an instinctive fear of being robbed of its food than to timidity of being observed; however, it always absolutely refused to eat in the presence of any one but myself. When desperately hungry it would carry a bit of bone, wood or any foreign object it could gather from the ground to its feeding board; or a bit of rabbit skin was plucked free from fur and the skin eaten. By the third week in September when its brethern were retiring southward, it attempted to obey the "call of the wild," refused to eat and beat ceaslessly against the wire of its enclosure until its cere was bleeding and forehead bare of feathers. A small, dead viper afforded it some lively amusement, and though it had probably never seen the like before, it displayed an instinctive caution in disposing of it Stretching head and neck to ascertain what sort of food it had before it, it instantly sprang upon the reptile, catching it in its left foot, and with poised wings, whirled around with raised right foot, evidently eying its prey for a possible strike; as usual with all prey, its head was first torn off and eaten. The quickness of the bird is wonderful, now and then it strikes my fingers before I can throw the food upon the stand, and the

other set of claws fly out like a flash to secure the prey falling from the board. Its grasp is painful and not easily loosened, though it will ordinarily rest harmless on my extended hand and playfully nibble at my fingers.

When five months old its actions gave the lie to the oft repeated assertion that the species was given to cowardice. One foggy morning a skunk harboring peacefully under one of the buildings, attempted to dig its way into the enclosure, doubtless tempted by the scraps dropped from the feeding board; the hawk sat as motionless as an owl, directly over the place where the animal's paws sought entrance, prepared to spring upon its bulky visitor. My scientific researches did not include a possible disablement of my pet nor the pollution of the atmosphere, besides I kept a box tortoise in the cage to act as a general scavenger, which duty it performed to my satisfaction; and I was not sorry to have the skunk retire before any damage was done. One or two days later, our cat, an immense tom, climbed to the top of the cage out of curiosity perhaps, and with sinewy yellow paws extended through the wire mesh, excited the hawk to an upward attack, flying against the wires much to the cat's discomforture. On Nevembeer 15, I placed it in its winter quarters in the barn loft and the next day discovered that it had escaped by dashing against a window sash, dislodging an 8x10 glass, a sufficiently large opening to afford an exit. It apparently roosted in a spruce in front of the house, and the next day I discovered it twenty-five feet up in a maple across the road Shooting a couple of English sparrows, I threw them on the snow near the tree and tried to coax it down. In response to my whistle which always meant food, it flew lower and again dropped a few more feet, but reconsidered the matter and retired to the former position. Toward evening it retired to the evergreens on my neighbor's place; again and again I almost had my hands on it only to have it take wing in the peculiarly exasperating manner of a half-tamed pet. The third day it came down to the line fence, being unable in its half-famished condition to make headway against a very high wind, though it fought its captor savagely.

Captivity had unfitted it for the strenuous life, and the deep snow prevented it picking up anything at all; returned to its old quarters in a highly excited state, it nevertheless broke its fast very willingly

This hawk's eyesight appears better in the dark than most diurnal birds, it was enabled to pounce upon and devour a bird thrown near it, long after twilight in the gloomy loft. When it was about seven months old, I gave it a five days fast before introducing an ancient Bantam rooster, which it refused to touch, so I placed the fowl to roost upon the pole alongside of it that evening and the next day removed the chicken. Ten days later the Bantam was again placed on a bench within three feet of the hawk. Buteo observed it intently for awhile and then deliberately walked over, giving it such a clout with its claws that the rooster set up a despairing cackle as it scuttled to the far end of the bench, while the hawk retired to its first position. Again Buteo advanced with outstretched neck and raised crest, little Dick believing his time had indeed arrived, made a great outcry, but the hawk took wing flying backward and forward over him, making a downward feint just above the ancient creature, time and again, adding to his alarm without doing any harm; and another day found him without injury. Meat, however, was growing scarce, the English sparrow no longer came upon the place, the enforced fast of the hawk sometimes extended for days together and the bantam constantly underfoot in the stable, so in February I found Buteo perched upon the dead body of the little fowl and seemed quite proud of its feat in bringing down such bulky game. It was an unfortunate kill, however, and resulted in the hawk's own death a few days later

My second captives, taken in 1907, were of opposite sex, designated Nip and Tuck, the latter being the male as found later, developed an altogether untamable disposition. I was compelled to wear gloves when handling them, and even then was occasionally cut through the leather. Strange to say, neither one uttered the characteristic whistle throughout the following winter and not until April 30, 1908, when about

nine months old, though chattering excitedly whenever I came near. A young Screech Owl was an inmate of the flying cage for several hours without being molested. The species penchant for snakes was again shown in the actions of Tuck when a house adder was admitted. He ran along the entire length of the shelf in a curious springing gait, with extended neck; the reptile was immediately seized and the head torn off, althought the bird had just been fed. Each bird had its favorite perch and feeding place Tuck was found dead Sept. 27, 1908. His body was unusually large for a male's and layers of fat were found under the skin and about the intestines. Nip lived through three spring and summer moults and would probably have survived a long time but for my inability to provide a sufficiently varied fare. Lack of change from beef lights without doubt contributed to the development of fainting fits upon the least excitement. She would fall upon her back with half-spread wings, flutter desperately for a short time and then lie motionless and stiff until I feared it was death. For about four months she was subject to this and finally I found her dead beside the body of a hen I had given her the day before from which she had been unable to tear a single morsel, September 19, 1910. This hawk was peculiarly fond of live catfish

Migration.

VERNAL—The more or less abundant migratory species of the Hawk tribe in North America (especially the *Accipiters* and *Buteos*) representing considerable areas of the more northern breeding grounds, apparently migrate in convergent lines and fairly consistent routes. These routes are as natural and as prone to error as the highways and bypaths of man. To all appearances, they simply follow the paths of least resistance as though not endowed with wings, following the coast line, river valleys, coursing around high elevations and large bodies of water, or crossing at the narrowest point. The flights are not so often what might be termed flocks, but rather a steady increasingly abundant stream of independent units at a height

varying from easy gunshot to or beyond the power of human vision. Social instinct being largly wanting, this migratory segregation is rather the inevitable result of a simultaneous crowding at the "fords or causeways" affording the most faforable passage; for remarkable as it may seem, these fierce, strong-winged birds of prey are adverse to crossing large bodies of water.

My data tends to the conclusion that the vast bulk of migrating Broad-wings ascend the Mississippi valley, distributing its quota near the mouth of every river valley. Natives of Minnesota and Manitoba region have a comparatively simple journey after entering the United States, but the vast horde pouring into the Ohio valley enroute for Ontario, Quebec and possibly northeastern United States and southeastern Canada, have a more intricate and fatiguing journey. As few, if any, migrants appear from the West Indies, the Gulf States must receive their supply from the Mississippi valley also; and the Atlantic States from North Carolina to Pennsylvania and New Jersey, overland from Tennessee, Cumberland and possibly Ohio valleys. More complete data may show a South Atlantic coast migration, of which I have no hint.

The arrival of the transient before the summer resident would seem to indicate that the more northern bird did not winter so far south as the latter. No doubt the vast flight trains originate in the leisurely forward movement of the van, until the constantly increasing hosts accelerate the leaders to swifter flight in order to reach a field less open to competition. Sennett observed fifty or more Broad-wings on the lower Rio Grande, April 11, 1878. According to E. F. Pope, it does not winter at Colimsneil, Tyler Co., Texas; arriving about the middle of March and from then on seldom out of sight or hearing. It usually makes its appearance in southern Louisiana about the end of March (Beyer, Allison and Kopman); and Andrew Allison states that he has not seen it in winter in Mississippi, arriving about April 1, not earlier than March 20; and at Woodbine, Coosa Co., Alabama, Aretas A. Saunders first records it in 1908 on March 25 and it soon became abundant. It is

rather irregular in Missouri, seldom seen in March, oftener in early April, but summer residents cannot be expected with certainly before the latter part of the month (Widmann.)

Mixed flocks of Red-tailed, Red-shouldered, Broad-winged and Cooper's Hawks were encountered in Iowa, April, 1862, when "hundreds slowly sailed over in the peculiar gyrating manner of these birds. They formed a long loose flock, extending both to the northward and southward as far as could be seen, the whole company occupying more than an hour in passing a given point" (Allen).

The earliest during 16 years' observation by Dr. I. S. Trostler in Douglas and Sarpy Cos., Nebraska, was April 1; yet H. E. Lee noted a flock of 15 on the Missouri River at Pierre, Douglas Co., South Dakota, Mar. 25, 1906. Preston mentions the many pleasing freaks of flight as the great company moves onward in the regions of the Red River of the North. Geo. E. Atkinson finds it early in May regularly, his first or earliest record being May 1, 1897, at Portage la Prairie, Manitoba.

On April 27, 1892, a flight of hawks which lasted all day, was observed at Chicago by Dunn. At one time in an opening of a small woods called Hog island, 14 birds were in sight. Most of them appeared to be medium-sized, perhaps one-fourth were small. Mr. Craig shot one of the latter which proved to be a Sharp-shin, and Mr. Dunn shot two of the former which were Broad-wings. They were rather tame, several alighted among the trees. They were all flying south or perhaps S. W., while the woods was full of other birds migrating northward. The day was warm and pleasant, with light thunder showers in the morning and the wind south, strong.

J. Claire Wood writes that along the Port Austin shore in Huron Co., Michigan, there is an annual spring flight. The local hunters spoke of shooting hundreds for sport and Arnold met with flocks there while after Eagles' eggs in April. They follow up the shore of Saginaw Bay. The village of Port Austin is separated from the extreme north point (Point Aux Barques) by two miles, more or less wooded and he could get no information from this point but believes they crossed easter-

ly into Ontario. In Wayne Co. he finds it most common during the latter half of April and early May when all the way from singles to two or three hundred may be seen at one time, always circling high in the air and gradually working northward. The earlier birds are all or nearly all adults and the majority from the middle of May to June are birds in the plumage of the second year. Few adults alight in the county, but many of the junior do so and some remain in suitable localities, until the middle of June. At Detroit he has seen more of the birds passing over the city than elsewhere (probably from more frequent opportunity) but they do not seem to be concentrated at any special point along the river, and all cross into Ontario. Detroit is practically at the head of Detroit river and while this hawk is rare north of the city limits (Lake St. Claire), it is more or less common on the south side (Detroit river). He believes that the bulk of the S. E. birds work N. and E., and the Michigan examples are all from the eastern Mississippi valley.

Swales gives the time of arrival in southeastern Michigan, as late April and early May. Norman A. Wood gives four dates for Ann Arbor, the earliest being April 15, 1905, and the latest May 25, 1897.

For Oberlin, Ohio, Baird gives March 1–10 for the earliest arrival based upon ten years records, while Jones gives about the middle of March for same localities. Prof. Jones gives a very interesting account of several flights witnessed by him near Cedar Point, Ohio, (which lies nearly opposite Point Pelee, Ontario). The two most conspicious of these flights were May 2, 1904, when a large company, associated with 6 Red-tailed, 1 Red-shouldered, 3 Rough-legged, 3 Sparrow, 2 Marsh Hawks and 2 Bald Eagles, were watched from the top of a sand-stone knoll two miles south of Oak Point. The Broad-wings disappeared to the N. E., but all the others returned apparently to their nesting places. The other occasion was April 29, 1907, at Rye Beach, when the numbers were too great to be counted. These Broad-wings were near the ground when first seen, but rapidly ascended in spirals, all the while

moving nearly parallel to the lake shore in an easterly direction. When they disappeared from view high up they were still drifting eastward over the land. In this company there were Sparrow, Marsh and Rough-legged Hawks, four of each, which did not accompany the Broad-wings far. When the birds were first seen they were about two miles west of the east end of the marshes, and therefore within plain view of Kelley's Island. It seems likely that they had arrived over the Sandusky River route, and therefore reached the lake shore, or the marshes near Sandusky. It is difficult to account for their easterly course if, as it seems almost certain, they were bent on reaching the Canadian side. At their elevation of several hundred feet they must have been able to see not only Kelley's but also Pelee Island, and probably also Point Pelee, Ontario.

Eaton of Rochester, N. Y., confirms the story of the incredible number of hawks passing each spring along the southern shore of Lake Ontario and toward the east over the country south of the lake,. evidently making their way around its eastern end toward the north. The height of these migrations occurs during the latter part of April and the first week in May. The birds are mostly Sharp-shinned and Broad-winged, with a sprinkling of Marsh and Pigeon always present, but surprisingly few Cooper's Hawks. At a time when the Red-tailed and Red-shouldered Hawks are nesting in western New York, it is surprising to see many of these species also soaring high in the air and wheeling toward the east. When the wind is high the hawks fly low, with less circling; the Sharp-shinned lowest of all. The writer was surprised to learn how many of the migrants were Broad-winged Hawks and states that they were certainly a conspicuous part of the procession, from April 21 to May 17.

J. H. Fleming writes me that near Glenwilliams, Halton Co., Ont., May 4, 1910, from the top of the ridge behind the quarry, he saw about a dozen Broad-wings high up over the ravine, later they descended, flying east, on or about his level along the ravine, then mounting and circling until at the

west end of the ravine, when they again came east, repeating this as long as he remained. The hawks were all in full plumage and afforded a close view as they passed on the near side of the ravine.

McIlwraith states that in southern Ontario, toward the end of April or early May, should the weather be clear, great numbers are seen soaring at a considerable height and moving in circles toward the northwest. It is a regular transient at Toronto and Fleming says that mature birds are rare. G. R. White informs me that it arrives at Ottawa about the 28th of April; and the Rev. G. Eifrig records it at the same place on April 24, 1908; also at Inlet, Labelle Co., Quebec (which is 50 miles northeast of Ottawa), on April 25, 1905. At Godbout, Quebec, Nap. A. Comeau finds it a very common migrant, apparently not nesting much along the coast line, but directing its flight further north. The bulk of the northern migration is about the middle of May.

Cairns stated that it arrived in Buncombe Co., North Carolina, about the end of March and C. S. Brimley finds it at Raleigh about the middle of April. The earliest record, March 20, 1896, in the vicinity of Berwyn, Pa., was made under peculiar conditions. The bird was found clinging with outstretched wings and tail to the leeward end of a cord of firewood, during a great wind storm, and was utterly unable to breast the gale. A. K. Pierce writes that it usually arrives at Renova, Clinton Co., Pa., the second week in April.

"J. P." commenting on the vernal flight of hawks which is of yearly occurance near New York city, says in 1890: Much of what was learned was due to the expert knowledge of the late Hank C. White, of Red Bank, N. J. . . . These hawks follow certain well-known courses on their passage north. This course seems to follow along the whole sea coast of New Jersey until Sandy Hook is reached. The birds, upon reaching Sandy Hook refuse to cross the lower bay, but double back, and passing the highlands of Navesink, strike inland. One of the most favored spots has been for

years at Morgan's station, a place where Cheesiquake creek flows into the lower bay. It was a few miles further to the southwest of Morgan's station that White stationed himself each spring, and remained there day after day, until the very laggards of the flight had passed along. . . . Since the preceding lines were written I have learned that the flight of hawks which passes northward over what is known as the Crow's Nest, a prominent height to the westward of the semi-mountain overlooking Mountclaire, was very much in evidence there on April 26. Ordinarily nearly every variety of hawk known is found in this annual flight.

In 1898 the same sportsman writes: The flight this season commenced the last Saturday in April. The first saw the vanguard straggling along one after another at slow intervals. The next day found the main body in full advance. The birds do not come in flocks; instead, it is a continuous current of birds, one following another with the regularity of clockwork and the precision of machinery. The greatest number ever seen at one time this year was ten, and these separated at about equal distances. Why they should follow the coast line is a puzzle. On the other hand, why should the birds leave the coast at one particular point and turn inward? To my certain knowledge this has been the case for thirty years past. The spot where they make this detour inland is a little south of Atlantic Highlands and over what is known as Mount Mitchell. If by chance a few of the birds pass that point and fly along the coast until Sandy Hook is reached, they invariably turn back and make use of the usual passageway. Possibly the birds are daunted by the long width of the waters of New York bay. Another thing that impresses one is in the fact that the returning flight southward in the fall does not take this direction. The movement is only in the spring time.

The birds fly in a straight line over the spot where the men locate themselves, and, with the exception of the larger birds, show no fear in their approach, even when the shooter stood out perfectly unconcealed. The big fellows appear to

be more wary, and these will make a detour to one side or the other from where the men stand. The little and medium ones come right along in straight line, the fall of one when shot disturbing not a whit the fellow in line behind it. Asking White how many he thought passed along on that day, he answered that he had not he slightest idea. It was a continuous stream of birds without a moment's cessation from daylight to the time the sun went down.

Muirhead also writes from the same locality: The idea is popular here (Cheesequake creek, South Amboy, N. J.) that the hawks fly in the wake of other species of migrating birds, which they overhaul and feed upon. We never have good hawk shooting unless all conditions are favorable—wind westerly and brisk. If there is little or no breeze the birds pass over high, most of them out of range. The reason given for seeing the hawks here when on their northern flight is explained in this wise: The wind must have been westerly for a day or two, and far enough inland to incline most of the birds in its area toward the ocean. When they come to this they resist the wind enough to keep them over the beach, and so string out along one after another until they come to Sandy Hook; then seeing nothing but water ahead, they change their course, following the beach up Sperm City cove and Raritan bay, and then continue their flight overland again; that is, those that escape, for many are killed.

"J. P." has already intimated that the flight occurs inland as far as Montclair, N. J., and (Karl V. S.) Howland, in 1873, says the hawks begin to pass through Montclair on their way north in the latter part of March. Since then he has shot specimens of the Red-tailed, Red-shouldered, Sparrow, Cooper's, Sharp-shinned, Broad-winged, and American Osprey. Randolph H. Howland, in answer to a recent inquiry from me, states that no large flights of the Broad-wings have been observed by him, although he has seen the bird in small groups, namely: a flock of 7 on Apr. 18, and 5 on May 9, 1905; and 11 on May 13, 1906. At Hartford, Conn., Sage gives the average date of arrival as Apr. 10-

20; and in Maine by Knight as early in April. Wm. Wood, East Windsor, Conn. (Am. Naturalist, V, 1871, p. 759-60), informs us that in 1856 his attention was called to twenty or more hawks—species not stated—that were diving, screaming and going through various gyrations high in the air, and passing to the N. E. in the early spring. Early in April, 1860, a similar migration was witnessed, when the number in sight at one time was about fifty. About the last of March or first of April, 1870, a friend of his observed a flight, when the air seemed filled with diving and screaming hawks passing northward and seventy were counted in sight at one time. In all of these flights they were not in flocks according to the common acceptance of the word, but were in pairs or groups of about four usually. Rev. Job states that about the middle of April or later there is sometimes witnessed a great flight, especially of the Broad-winged Hawk. Along the Housatonic Valley, in Conn., he has seen loose squadrons of them. Dr. Allen mentions flights at Springfield, Mass., for several years quite regular in appearance, in autumn as well as spring.

Locality	Yrs. observ.	Av. date.	Earliest date.	Latest date.
Lexington, Ky.	2		Apr. 18, '05,	May 7, '04.
Chicago Vic.	8	Apr. 22,	Feb. 11, '97,	May 5, '00.
Lorain Co., O.	7	Apr. 17,	Mar. 13,	May 10,
Toronto, Ont.	11	Apr. 22,	Mar. 6, '97,	May 13, '99.
Ottawa, Ont.	4	Apr. 29,	Apr. 24, '08,	May 19,
Pierre, S. Dak.	2		Mar. 25, '06,	Apr. 12, '07.
Tolma, No. Dak.	2		Apr. 4,	Apr. 20
Winnipeg, Man.	1			May 3, '05.
Edmonton, Alb.	1			May 8, '03.
Philadelphia Vic.	12	Apr. 14,	Mar. 1, '04,	Apr. 30, '05.
Princeton, N. J.	3		Feb. 7, '06,	Apr. 22, '07.
Franklin Co., Me.	11	May 1,	Apr. 14, '96,	May 28, '06.

AUTUMNAL.—The retrograde movement can be traced in the east through Rhode Island, Connecticut, southeastern New York, northern New Jersey, eastern Pennsylvania, and Maryland and Virginia, when it is lost. No general movement in the middle west south of the Great Lakes appears. The Canadian contingent does not utilize the various passages between these large bodies of water to any extent as

far as I have been able to obtain information; doubtless many cross the St. Lawrence and join the eastern flight of mixed species, and probably many take the westerly course until Wisconsin offers an unobstructed passage south. At Godbout, Quebec, Napoleon A. Comeau writes that the return or southern migration is in the first week in October. Some years it is very abundant. This was especially the case in the fall of 1904, when hundreds were seen daily. In the migrations it flies high and nearly every one keeps to the same line of flight. J. H. Fleming noted a flight along the ridge north of Toronto, Ontario, Sept. 21-22, 1905; and various writers report flights of regular occurrence in the province.

A visitation of Broad-wings occurred at Middletown Springs, Vt., in the fall of 1904, but W. S. Hickox informs me that it did not compare to the invasion of Goshawks in the fall of 1906. Dr. Shufeldt, commenting on the large mixed flights of annual occurrance in Connecticut, says: "The latter part of October is a good time to see it, especially after there has been a sharp frost or two. Any high, cleared land is the locality to be sought, and if the movement is on and the day clear, one will soon be struck by the number passing. They do not fly very high as a rule, and here the trend is westward, while after they arrive on the Atlantic coast the flight is southward. They seem to pay but very little attention to objects below, and one may shoot at them all day without very materially changing position. On they come, flying in undeviating files, and often the individuals not more than five or ten minutes apart, or even less. They come at random, regardless of kin or kind, and they keep coming until the sun goes down."

In certain sections of Rhode Island, according to Dunn, large flights of hawks may be seen during the latter part of August, and through September and October, whenever there is a stormy N. W. wind. They seem to follow the coast, as three miles back from the shore only a few stragglers can be found. Specimens of the Marsh, Sharp-shinned,

Cooper's, Goshawk, Red-tailed, Red-shouldered, Broad-winged, Duck, Pigeon and Sparrow Hawks were obtained. H. S. Hathaway writes me that quite a few are shot for the bounty offered by the state during the fall flight in September, which follows the southern shore.

At Bay Ridge, Long Island, Wilmot Townsend observes: "I have not seen them save on the annual flights, which occurred very regularly each autumn, Sept. 24 to 27. I say *occurred*, for I have not observed them for some years past, —say five or six, the neighborhood being all built up and the birds finding no place to halt, have largely deserted us. I remember the flight of Sept. 27, 1892, was marked by the unusual number of Broad-wings that appeared, circling as is their habit, by hundreds, high in the air. It was a very unusual flight, both as to numbers of various species (Broad-wings predominating) and as to weather conditions, Temp. 53°. Wind light N. N. W., with high barometer and a crystal sky."

Trowbridge has given a great deal of time and attention to this phenomenon. He informs us that "at New Haven, Conn., Sept. 16, 1887, there occurred another great flight of hawks, and I was again fortunate enough to witness it. There was little wind at first, and the hawks did not appear until nine o'clock in the morning, when a few Sharp-shinned Hawks were observed. But later on the wind increased in force. Thousands of hawks of different species flew past, and Broad-winged Hawks, both adults and young, appeared soaring in immense clusters. In one great flock alone there must have been 300 hawks, the greater part were undoubtedly *Buteo platypterus*, although with field glasses I distinguished several species in the flock, one week later, on Sept. 21, after a number of days of southerly winds, there occurred a flight which lasted from six o'clock in the morning until noon. I was informed by several collectors, who were out shooting at the time, that three flocks of Broad-wings passed over them, and they were able to secure a number. Sept. 18, 1890, when a large flight occurred, the day

was warm and partly cloudy, but there was a light breeze from the N. W., and there had been southerly winds for a long period previous, which seemed to show that the south winds had temporarily checked the migration of the hawks. During this flight, the hawks flew higher than usual, but I observed two immense flocks of Broad-wings, and I saw several of them shot down, together with Sparrow, Sharp-shinned and Cooper's Hawks, all of which were plentiful. Sept. 20, 1893. Few hawks noted this date. Obtained two Broad-winged, a Sparrow and a Pigeon Hawk. Sharp-shins were very abundant. Sept. 21, early in the day there appeared a flock of about 25 Broad-wings circling low over the city. I hastened out and soon stood in a position favorable for observation, where I saw hundreds of them and secured eight beautiful adults with the greatest ease. I even took a selection of plumage, as the birds passed a few yards overhead, battling against the strong wind which blew from the N. W., as they flew along the coast."

Trowbridge's List of Hawk Flights, which have occurred in Southern Connecticut During the Years 1885-1894:

Date.	Weather.	Wind.	Broad-winged Hawk.
Sept. 22, 1886.	Clear.	N. W., light.	Abundant.
Sept. 16, 1887.	Clear and cool.	N. W. very strong.	Great flight all day.
Sept. 17, 1887.	Clear and cool.	N., light.	Abundant early in morning.
Sept. 24, 1887.	Clear and cool.	N. W. to N., strong.	Abundant also *A. velox*.
Sept. 18, 1890.	Fair and warm.	N. W., light.	Abundant.
Sept. 20, 1893.	Clear and warm.	N. W., mod. fresh.	Abundant.
Sept. 21, 1893.	Clear and cool.	N. N. W., very strong.	Great flights.

Willard says its numbers are most noticeable at Utica, N. Y., during the months of July and August, when the appearance of so many in the air at a time, one might consider it a very abundant bird; and Barbour of an extensive flight at Lake Minnewaska: "The birds were in most cases circling, sometimes sailing straight forward, beating of the wings being extremely rare. As, in clear weather, the birds were very high, and in bad weather the light was very poor,

I will not insist too strenuously upon my identification of the hawks as Broad-wings, but I am substantially certain. The flocks were moving, in the main, from N. E. to S. W., but parts of some of the flocks turned off to the west. They were accompanied, or followed, occasionally, by Red-shouldered; once or twice, apparently, by Fish Hawks; twice by Marsh Hawks, and once by an Eagle. The flocks seen by me then, numbered as follows: Sept. 15, 30; Sept. 16, 15; Sept. 17, 11 and 30; Sept. 20, 35, 35, 50, 66, 10, 23, 50, 15, 40; Sept. 21, 30." He also publishes a letter from Kirk Monroe, who observed the same phenomenon at the Ice Caves of the Shawangunk mountains, near Ellenville: "Sept. 18, the forerunners were a few stragglers that only caused comments by their undeviating and unhesitating southward flight. These leaders were, however, quickly followed by other birds in ever increasing numbers until the marvelous flight extended as far as the eye could reach to the eastward; and upward to a point when the great birds appeared no larger than sparrows. When the hawks first aroused curiosity by their numbers, one of my companions undertook to count them, but having counted 50 in less than one minute, he gave up the attempt, and was glad to have done when, at the end of an hour the incredible flight still continued without pause or diminution. I cannot venture even to guess how many hawks passed above us during that time; but know that they numbered well up among the thousands. I would add that three days after encountering this remarkable flight, I witnessed another of the same character, only this time numbering but two or three hundred individuals, taking the same southerly direction over Sam's Point, but a few miles from the caves visited on the previous occasion." Sixty miles S. W. of Ellenville and Lake Minnewangunk, N. Y., in Sussex Co., N. J., von Lengerke has observed for a number of years the migration of thousands of hawks. He says: "On Sept. 22, '07, the number exceeded any ever observed before. I was on the top of a mountain near Stag Lake, about 1200 ft. above sea level. I

was armed with a Hensoldt binocular eight power glass. The day was clear, and at one time late in the forenoon, several thousand hawks, Broad-wings mostly, were in view. They came from a northeasterly direction. A constant stream, very high up, could be seen for a long while, and they were going in the direction of the Delaware Water Gap. Over the valley to the S. W. the birds seemed to collect into an immense flock, while hundreds, if not thousands, of birds were gyrating around and around; describing smaller and larger circles in the air, in height of from, I should judge, 600 to 2000 ft. above the earth. Most birds were Broad-wings. There were, however, other hawks, such as Red-tails and Red-shoulders among them, while the *Accipiter* genus was represented by some Cooper's and more Sharp-shinned, which, however, were mostly flying lower and took no part in the general evolution. Some days I have observed about every species of hawks that we find in this part of the country, from the same stand. The most extensive migrations occur just before a storm." Horsfall adds his observations while at Shawnee, Pa.: "The line of flight for hawks, and also other birds, such as Crows, Blackbirds, Nighthawks, etc., was down the west side of the Delaware river just below the crest of the hills, until reaching a point about two miles above the Delaware Water Gap, when they would invariably rise over a low corner of the hills and pass on to the S. W. by W,. going north of the Kittating mountain range. No birds were observed to go through the Gap, though I would not say that none do."

Randolph H. Howland observed at Upper Montclair, N. J., a flock of 5 on Nov. 29, '04, and 8 on Aug. 30, '05. (Karl V. S.) Howland records at the same place, Sept. 18, 1893, 37 shot from three blinds on Orange mountain, and others seen. The most common were the Broad-winged and Sharp-shinned Hawks. Babson mentions large flocks of the Broad-wings migrating high in the air, over Princeton; and Philip Laurent that he never at any time found the latter common, although he saw a flight of the Pigeon Hawk,

some sixteen years ago on Five Mile Beach, which at that time was not the summer resort that it is today. He saw at least 50 birds in the air at one time, and they were working southwest.

Leonard Pierson reports a flight of 15 at Wayne, flying S. W., between 2:30 and 4:30 p. m. Sept. 25, '07.

William B. Evans saw a flock or about 30-50 individuals on Sept. 13, 1905, between Clifton and Burmont, on the P., B. and W. R. R., Delaware Co., Pa.; and extensive migrations of unidentified hawks occur near Berwyn, but at so great a height few are reported. The Red-shouldered Hawk, which does not summer with us, outnumbers, ten to one, any other species coming to earth at this season. I am informed by H. Justice Roddy, that he noted in Sept., 1888, while at a signal station on top of Pilot Knob, Perry Co., Pa., a great migration of the Broad-wing. He counted not less than 1000 individuals moving S. E. An occasional Cooper's and Red-tailed Hawk accompanied the flight.

J. H. Riley, Fall Church, Va., has upon one or two occasions seen a dozen, probably more, during a day's shooting late in the fall, and always supposed they were migrating, as they were nearly always flying toward the south. Rev. G. Eifrig noted, near Cumberland, Md., Sept. 21, '01, 11 a. m., a flock of about 25 circling in a very picturesque way over Will's run. The circles of the several birds had different centers, but overlapped more or less. Fine sunny day, no wind. Ellzey mentions the extraordinary number of hawks, Broad-wings predominating, during the fall of 1889, in Howard Co., Md.

Prof. Ellison A. Smyth saw a flock of 14 in pairs, and in threes and fours, but nearly all in sight at once, near Blacksburg, Va. All were flying very high toward the S. W. They would stop and circle for a minute or two then continue until all had disappeared.

Scott quotes Atkins to the effect that on Oct. 21, 1887, he saw at Key West, Florida, a large flock of hawks, 150 or more, mainly of this species. Andrew Allison says that it

gathers in small flocks for migration, together with the *Ictinia* in late summer, and usually all are gone from Mississippi by Sept. 1.

Taverner and Swales, who have made extensive observations on Lake Erie at the southernmost point of Canadian mainland, Point Pelee, Ont., inform us that it arrives about the last of August, but does not appear in any numbers until the main body comes down with the Sharp-shins. Even then not more than a dozen have been seen at any one time—Sept. 18, '06. Keays listed but three in Sept. '01. Later, B. H. Swales writes me that as yet no spring records, but in the fall he has found the birds in small numbers from Aug. 20 ('10) to Oct. 14 ('06). The birds cross the lake in sight of the chain of islands extending to the Ohio shore. J. Claire Wood has observed no autumnal flight in Wayne Co., Mich., even when the southward movement is at its height in September, not more than 6 or 7 birds are seen in a day, and more often none.

At Portage la Prairie, Manitoba, George E. Atkinson reports that about the middle of August the young and fall plumaged birds are noted commonly about the city. It seems more affected by low temperature than the other hawks and leaves usually in September. Hatch states that it departs from Minnesota about Sept. 1. Kumlien says it sometimes appears in Wisconsin in immense flocks, many hundred can be seen at one time, remembering one such flight in 1871, when he killed six at a single discharge. At the time of the autumnal flights they are very fat and seem to be principally young birds. Later Kumlien and Hollister state that this migration seldom lasts but a day or two and is of irregular occurrence, and the flocks are invariably of this species alone.

In Missouri, Widmann finds the migration from the north brisk during the fourth week in September, when on some days dozens may be seen sailing over in loose flocks. It does not stop over as long as the Red-tail and Red-shoulder, but small parties may be met with during the first half of

October, after which it becomes rare, though the last may be noted a month later (Nov. 11, '97, Keokuk-Currier). He informe me that on Sept. 22 and 23,, during a little migration at Washington and New Haven, Mo.—55-65 miles west ofSt. Louis, on the Missouri river: 20 were seen on the forenoon and afternoon of the 22nd and 9 at 8:30 a. m. on the 23rd. They went south soaring at a considerable height, but the light being good the color of the underparts, especially the two whitish bands on the tail, could be plainly seen, and together with the general contour, made identification easy. (There was also a migration of Cooper's Hawks going on). Broad-wings do not winter in Missouri; all are gone by the end of October.

Irving H. Wentworth writes me that they arrive from the north about the first week of September and remain until early spring, frequenting the heavy timber in "bottoms" and along streams, in Kendall Co., Texas.

Locality.	Yrs. Observ.	Av. date.	Earliest date.	Latest date.
Franklin, Me.	4	Sept. 27,	Sept. 12, '04,	Oct. 7, '05.
Montclair, N. J.	3	Sept. 26,	Aug. 13, '05,	Nov. 29, '04.
Princeton, N. J.	2		Oct. 31, '07,	Dec. 9, '06.
Philadelphia Vic.	4	Sept. 14,	Sept. 1, '92,	Oct. 5.
Toronto, Vic.	7	Sept. 18,	Sept. 11, '03,	Sept. 28.
Edmonton Alb.	1		Sept. 5, '03,	
Chicago Vic.	6	Sept. 10,	Aug. 9, '98	Oct. 4, '94.
Tolma, N. Dak.	2		Sept. 10,	Oct. 20,

Station.

Blanchan says: "No retreat is too lonely for these devoted mates, that ever delight in each other's company. While its range is wide, it is locally common in few places and rare in others, a lover of wild, unvisited regions." Reed states: "Some localities seem to have a strong attraction for them, particularly heavy pieces of woodland, and near some lake or pond, and they return to the same place year after year." Willard has found that it is found in some numbers in all upland wood tracts," while Ralph, writing of same locality, says it is "the Hawk of the Adirondack wilderness, and it replaces in this locality the Red-

tailed and Red-shouldered Buteos, which are so common in the smaller woods of the more settled parts of this state. I think that with the exception of the Pigeon Hawk and Goshawk, which probably breed here also but are very rare, they are the only Hawks that nest in the interior of these woods, but along the borders they are sometimes found breeding in the same situations as the more common species. They are very fond of living near water in close proximity to the lakes and streams which are so numerous in the Adirondack region. The smaller lakes especially are favorite places of resort, and when a pair takes possesion of one they apparently hold it against all intruders of their kind." In Minnesota, Preston graphically describes the "hidden retreats, where the tangled wilderness of lakes and forests guards in lonely silences the streams which feed the Red River of the North, I found the Broad-winged Hawk breeding abundantly. At home with the Barred Owl, and unmolested by stealthy tread of wildcat or lynx, he is in this region indeed a 'bird of the wilderness.' He chooses the heavy, close woods about small lakes, where food is abundant and shelter near, and where he may hide himself."

In Ontario, "unlike the Red-shouldered Hawk, it is partial to the thick swampy woods near a creek" (Macoun). Bendire says it is "most often found in the more extensive woods near water and in swamps, and much less frequently in the more open and cultivated sections." While Gentry finds "it prefers high open woods and waste grounds chiefly of a marshy nature, seldom venturing near human habitation."

In the vicinity of Lancaster, N. H., a mixed growth of woods seems to be preferred, and many times, trees beside small streams are chosen for the nest. Rarely is the bird seen away from the woods in which its nest is located, during the breeding season; and it is very much attached to its old nesting haunts, returning for several years in succession (Spaulding ms). In the western part of Bristol, Co., Mass., where the prevailing heavy timber consists of hardwoods,

its chosen haunts are in the more remote and largest tracts of medium-sized chestnut and oaks, usually in high and dry woods. In Bristol and Plymouth counties, it is a quiet, retiring, forest-loving species, and for that reason may be easily overlooked. I have never seen it circling high in the air and screaming as both the Red-tailed and Red-shouldered Hawks are wont to do, and almost never see it except in the breeding season, and then only in the deep woods. Although it breeds on the average a month later than the Red-shouldered, it frequents practically the same localities (Bent ms.).

In Fairfield Co., Conn., its persistancy of nesting is not so marked as with the Red-shouldered, and my experience is rather at variance with other writers in this respect. It prefers to take rather open situations for nesting, and very frequently the nests are located close to where woodchoppers have just finished off chopping (Beers ms.). About Norwich, Conn., the nest is generally found near the head of a small ravine; if a brook runs through it, from brook to quarter way up hill. Any little gullies in outskirts of heavy timber near a pond hole or where the ground is fairly clean; and when the above conditions do not exist, not over 75 yards from the edge of the woods and near a cart road. Whichever location is selected, nest will be within sight of water and near farms, never in a wilderness. My experience is that it never travels far, and I have not seen one half a mile from its nest (Richards ms.). At Stephentown, N. Y., the nesting sites are all in the vicinity of water, swamps, small streams or ponds, and often close to wood roads, wood paths or little openings in the woods, or near edge of large tracts, not far from open pastures or meadows. These nesting sites were all mixed woodland, in which hemlock or pines were well represented (Hoag ms.). Near Auburn, N. Y., a nest was built near the edge of a quite heavily timbered small swamp, perhaps 20 acres in extent, having standing water. The principal growth of trees were elm and black ash; on the west and S. W. sides of the swamp was upland,

timbered with beech and maple (Rathbun ms.). Four or five pairs are known to nest near West Chester, Pa., year after year. The nest is always in the deep woods, and as it is not built until the leaves appear, it is not so apt to be seen as the nests of the earlier hawks (Sharples ms.). In Pennsylvania it haunts the wild rocky wooded ravines above the small streams and close to small ponds and swamps. While it is not unknown to the large grove, it loves the continuous woods over which it can pass undisturbed and unseen from one feeding ground to another; shunning the cultivated area altogether or traversing it only to visit some nearby swamp or pond (Burns ms.). Near Washington, D. C., it departs from its usual habit, selecting rather open timber probably because heavy timber is scarce near the District (Riley).

In Florida it was found in the center of 50 acres woodland (Williams ms.).

In Illinois and Missouri it prefers small woodland areas, or groves, of some few acres in extent (Smyth, Jr. ms.).

Near Edmonton, Alberta, a nest was located in the dense woods, and was found by the bird calling when close at hand (Stansell ms.).

In the vicinity of Minneapolis, Minn., there seem to be more Broad-wings nesting than any other place I know of. The country is wooded with hardwood, slightly rolling, with some high hills and considerable bodies of water. There are a good many marshes also, and low places, and in and around such places I always found it nesting invariably in thick woods of good-sized timber, near the edge, with a free sweep in one direction. Three or four nests were in tamarack swamps where the water was a foot deep during nesting time. Every year I could count on finding the nest of each pair that I knew, usually within half a mile at the utmost of last year's nest. One nest which was within ten feet of a highway but in thick woods and invisible from the road in summer, was used three times with an interval of one year between each using. With rare exceptions I found only one pair nesting in each piece of timber and always

within a few hundred yards of water, and in fact many times right on the bank of some water (Currie ms.).

The single nest found near Omaha, Neb., was in a woods half a mile distant and 150 feet above the Missouri river, near the crest of a ridge (Shoemaker ms.).

In Tyler Co., Texas, it is confined exclusively to the oak ridges in the dry pine woods, at least I have never found a nest in any other kind of locality (Pope ms.).

The ideal station, and I refer to a definite existing locality in S. E. Pa., would seem to be a tract consisting of upland, hillside and swamp, well covered with mixed hardwood timber, with here and there an unoccupied clearing, an unfrequented public highway, cart road or path, with room enough for the silent deadly swoop after the unfortunate mouse or red squirrel; also a small stream or pond, in the shallow reaches of which it can snatch the crayfish, and surprise the frog or trout-eating water snake on the borders of the pools. The verdant foliage supplies it with numberless insects and fat larvæ. As it sits upon one of its favorite perches, well hidden by a leafy screen, should a chance human intrude, it cranes its neck and utters its plaintive whistle, which the uninitiated attributes to the cry of one of the numerous small woodland birds or the creaking of two opposing branches in the wind. Fortunate indeed is the nature student who is familiar with the Broad-winged Hawk in its home.

Mating.

I believe this species frequently if not always mate for life, but unfortunately direct evidence is wanting. Circumstantial evidence in the way of certain peculiarities of situation, nest building and material, individuality of the shell markings, etc., may apply only to the female. However, the fatalities constantly occuring in the ranks of the adults, and the yearly accession of the increase, make the business of mating fairly brisk, though so seldom reported. The birds are then positively noisy, and very restless. That keen oologist, Preston, reporting from the small tributaries of the Red River of the

North, Minn., states that "during the mating season (which begins about the first week in May), the clear, shrill screams constantly echo in the dim woods, as one answers back to another from some chosen perch." Rev. Peabody observed "at the margin of a field, a pair copulating, the male swooping down upon his mate as she rested lightly in a sapling top." Mearns, Cantwell and Swales have found the adult mated to an immature, in one or more instances.

SITUATION OF NEST.—Almost every variety of forest tree has been utilized at one time or another, but the most abundant or characteristic species of the locality is apt to be the favorite. In central Alberta it is found in birch or poplar. In the vicinity of the Muskoka lakes, Ont., Spreadborough always found its nest in the large black birches; while White found it to prefer a hemlock or swamp ash near Ottawa, and Young of the same Province, states that the black or yellow birch seems to be the favorite. In Maine, New Hampshire, and Vermont, yellow birch is used more than all other species of trees combined, and as one collector writes, most of them are pretty difficult to climb. In the western part of Bristol Co., Mass., it seems to prefer to nest in chestnuts, though there are numerous groves of white pine. In the eastern part of Bristol Co., and Plymouth Co., where the large tracts of heavy timber are principally white pine and where chestnuts are rare or almost unknown, it nests almost invariably in the pines, though oaks are frequently available (Bent. ms.).

In Rhode Island, Connecticut, New York and Pennsylvania, chestnut is the favorite, with more than an occasional beech, hemlock, oak, maple, birch, or hickory. Babson of Princeton, N. J., found the several nests which came under his observation, to be in low oaks. Renova, Clinton Co., Pa., the oak, maple, black birch and chestnut are chosen, never an evergreen (Pierce ms.). Fleetwood, Bucks Co., Pa., all have been in chestnut trees (Liebelsperger ms.). In Chester Co., Pa., it has a strong preference for the chestnut (Sharples ms.). Shufeldt describes a nest in Maryland, near Tacoma Park, fifty feet up in an ill-shapen oak with short crooked limbs, in

a rather open piece of woods of some extent, and near the hilly bank of a small stream. One nest in Putnam Co., West Virginia was in a tall hickory (Morgan ms.); and another near Blacksburg, Montgomery Co., Virginia, was in an enormous white oak, fully seventy feet up, the main trunk about five feet in diameter (Smythe Jr., ms.). Virginia and North Carolina nests have usually been found in pine, maple, oak, chestnut, tulip poplar and magnolia; and Florida birds seem to prefer pine with an occasional magnolia. In the middle west or Great Lakes States, it seems to be uncommon enough as a breeder to have developed no marked preference; but in Minnesota, Preston found it in the basswood, elm, oak, and larch. Cantwell says small red oaks are favorites and others have found it in oaks, poplar, beech, maple, pine and walnut, with the oaks and basswood the favorites. Dresser states that it nests high up in cottonwoods almost inaccessible, on the Colorado in Texas, and at Colmesneil, Tyler Co., Tex., it seems partial to large red oaks and as a rule doesn't place the nest very high up, one nest however, was sixty-five feet up in a pine (Pope ms.).

On St. Vincent, West Indies, Lister says of *Buteo platypterus antillarum*, that its nest is often built in a bread-fruit tree; and Clark states that it is usually placed in a large tree, often a bread-fruit or cabbage palm. While on Grenada Island, Wells has found its nest on the fronds of the palmetto, and on large trees like the silk-cotton (*Ceibra*). Verrill states that *B. p. riviciri* of Dominica builds a nest of sticks, grass and trash in high trees or on cliffs.

The nest is usually placed in the many-forked crotch of the main stem, which not only forms a secure base but also often the substantial supporting timbers of the rudely constructed home. Sometimes it is placed on several small branches against the trunk, an old nest of some sort furnishing the foundations usually. Rarely is it found well out on a forked branch away from the main bole. Preston mentions one in a drooping branch of an elm on a steep bluff, 30 feet above the Pelican river, Minn., which was visited at risk of life and

limb; and another instance near Fairfield, Conn., May 14, '89, by a pair very much attached to the home site on Heatherstone hill, built 45 feet up and 12 feet out from the body of a large white oak (Hamlin ms.). A set was taken by Forge in Manatoba from the top of a stump 30 feet high (Jackson ms.). The height from the ground varies from 3 feet in the broad-forked bole in Minnesota as recorded by George Cantwell, to the 87 foot oak of Delaware Co., Pa., essayed by Harry G. Parker, and the 90 foot black ash of Kalamazoo, Mich., made famous by Dr. Gibbs.

One hundred and sixty-seven nests in the Canadian and Transition zones average 33 feet from the ground, the west averaging 10 feet less than the east. Massachusetts much lower than those of the heavy timber of New Hampshire and Connecticut. Manitoba and Minnesota not infrequently exhibit nests at altitudes of 10 feet. In the upper Austral zone, 112 nests average 40 feet; and 12 nests in the lower Austral zone average 49 feet. Occasionally we hear of some inaccessible (Swales, Wayne Co., Mich.; N. G. Wood, Ann Arbor, Mich.; Smyth, Blackburg, Va., all in large oaks; and Fleming, Emsdale, Dist. Parry Sound, Ont., in large tamarack).

Owen Durfee writes me that at times, it uses a flat platform on the top of a branching stub and this seems to be more of its choice for a site in the heavier timber on the Connecticut coast and in the northern woods. In this case, when the tree branches evenly making a flat platform, the nest will often have barely enough sticks on its circumferance to keep the eggs from rolling out. At such times it is difficult to locate the nest, if elevated, unless the bird is seen leaving it. Chas. C. Richards describes a nest 70 feet up in a big hemlock, made of hemlock sticks and twigs, almost invisible from the ground. Harry S. Hathaway and John H. Flanagan found a singular nest containing a runt egg, May 13, 1906, in Rhode Island. It was 15 feet up in a red maple, the nest was about as large as the sitting female, and had the appearance of having lodged in the forks formed by a limb about 1½ inches in diameter growing almost parallel with the trunk of some 6 inches.

Doubtless verbose accounts of the adventures of collectors are out of place in a paper of any scientific pretentions, but it seems almost a crime not to chronicle the accomplishments of some one of that nervy and self-reliant class known as field oologists. Calvin L. Rawson, the famous "J. M. W.," than whom there does not exist a more genial writer; says few sports are more dangerous, and no work more exhausting than long hard climbs to the nests of rapacious birds.

I here record the species of trees used by the Broad-wing as nesting sites, according to their popularity:*Castana dentata* chestnut, *Quercus* sp. oak,*Pinus* sp. pine,*Betula lutea* yellow, or gray birch,*Acer saccharinum* sugar, hard or rock maple, *Fagus americana* beech, *Betula* sp. birch, *P. strobus* white pine, *Q. alba* white oak, *Q. velutina Q. rubra* black oak, *Q. prinus* chestnut oak, *Tilia americana* American linden or basswood.*Tsuga canadensis* hemlock,*Populus grandidentata* poplar, *Hickoria alba* hickory, *H. ovata* shellbark, *A. saccharinum* white or soft maple, *Q. macrocarpa* burr oak, *A. rubrum* red maple, *Magnolia virginiana* magnolia, *B. lenta, B. niger* black birch, *B. populifolia* white birch, *Populus deltoides* cottonwood, *Fraxinus niger* black or water ash, *F. americanus* white ash, *Q. palustris* pin oak, *Ulmus* sp. elm, *U. fulva* red elm, *Juglans niger* black walnut, *J. cinerea* white walnut, *Picea* sp. spruce, *Populus candicans* Balm of Gilead, *P. pennsylvanicus* wild cherry.

Nidification.

CONSTRUCTION AND COMPOSITION OF NEST—During the often protracted period of hesitation as to the availability of the various nesting sites, the former nests are visited and the birds are quite noisy, but soon after the site is selected by the female, silence is observed and both sexes assist at nest building, gathering the dead sticks from the ground, carrying them to the tree in their talons. Chas. C. Richards saw a male with a piece of bark about 4 inches long in one set of claws, at right angles with his body, fly toward the nest from the south, while at about the same time the female appeared from the

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BROAD-WINGED HAWK (*Buteo platypterus*)

Position of nest. Rehoboth, Mass., May 20, 1906

(Photographed by Owen Durfee)

east with a small stick 4 to 6 inches long, in the same position. The species is a very crude builder and prefers to utilize an old structure of the crow, hawk, or squirrel, if the situation is favorable, rather than build the foundations itself; though not infrequently it does so, dropping more or less material at the base of the tree. Love for a former home will often influence it to return to a former site in a few years, even after every vestage of its former nest has disappeared. G. M. Allen has recorded a pair at Intervale, N. H., which nested for several seasons in a large beech. The nest was a high pile of sticks, evidently the accumulation of years. Rarely, however, it will occupy the nest of the previous year, either using it as a foundation for a new structure, or pulling out the old, reline it. F. E. Newberry gives an instance of a nest of a Red-shoulder robbed at East Greenwich, R. I., and a Broad-wing taking possession after removing the old lining. The period of construction is ofttimes protracted, but too much curiosity leads to the desertion of the location and no time of its duration can be given. An occupied and newly built nest taken by me at Berwyn, May 13, '99, was found to contain the following material: 20 white oak twigs, 6 to 10 inches long; 26 chestnut twigs, 4 to 16 inches; 50 chestnut oak twigs, 5 to 16 inches long and many-branched; 77 dead sticks probably principally chestnut; 2 chestnut blossoms, 46 chestnut bark scales, 1x2 to 2x6 inches; and a few leaf sprays. It was placed upon a foundation consisting of a Crow's nest, from which it was separated.

Dead sticks, twigs and pieces of bark principally, occasionally corn husk, bits of moss and live twigs of any easily obtainable variety of tree; lined with a quantity of rough bark scales from the trunks of the chestnut, oak, maple, beech, balsam, spruce, hemlock, pine or birch, according to locality, only one kind being used in a nest; often a few green twigs of the spruce, poplar, hemlock, fir or red cedar are added; more rarely, strips of inner tree bark, or red cedar, wild grape vine or pine bark, or bits of moss, usnea or lichen-covered bark may be used; and in two instances (Mass., N. J.) pine needles, and

in one instance (Florida) chicken feathers, formed the lining in part Audubon, followed by Brewer, Zadock Thompson and Holmes, and later by Gentry, Goss, Hatch and Dugmore; have stated that the nest is lined variously with strips of bark, rootlets, moss and feathers of the domestic fowl. Lining of this nature appear more characteristic of the Red-shouldered Hawk, and the error probably originated with Audubon taking the description at second hand from his brother-in-law or from the fact of the nest being profusely feathered by the moulting female.

Entirely new nests have better and more bulky appearance than the old patched up ones. In Central America, Salvin and Godman found no marked difference in the nest, roughly made of sticks, with a lining of bark and a few live twigs, sometimes built very near the ground. The Grenada bird builds a large bulky structure of dry sticks, according to Wells.

An almost invariable custom of the Broad-wing is that of placing sprays of fresh green leaves and sometimes blossoms, of the chestnut, oak, poplar, maple, wild cherry, basswood, cottonwood, elm, pine, spruce, hemlock, balsam, and in one instance, evergreen vine and swamp grass, in the nest, under and around the eggs or young; seldom more than one kind of leaf used in the individual nest, though it is frequently renewed. The sprays are broken from the tops of trees and carried to the nest by means of the beak. In rare instances when the leaves have not appeared, green twigs with buds and blossoms attached, have been employed.

Rev. Job has shown in photographic reproduction, the female on a stub close to the nest, with a piece of bark in her bill, evidently for the purpose of adding to her nest, and he informs me that on May 18, '08, he photographed the same bird as she brought a long strip of bark into the nest. Rarely, a few evergreen vines, wood plants or swamp grass may be used. Various reasons have been advanced for this very common trait of the Broad-wing, but all appear to be equally fallacious. There is very little ground for the theory of ornamentation or that the bird possesses the artistic sense in the slight-

Raptorics should require protection from predatory animals. It is more likely the lingering vestige of the instinct that led its reptilian ancestors to employ decaying vegetation to develop the embryo. No doubt the moist tender leaf imparts more or less heat to the eggs, and as the habit is not abandoned until after the brood is able to clamber to the side of the nest, it serves the treble purpose: first a soft and warm bed for the callow young, and as the decaying refuse accumulate and the large tree ants, wood lice and ticks multiply, the successive layers become a matter of sanitation and protection. Almost all or our nest building *Raptores* are more or less addicted to this habit, none to the extent of this member, however. It seems to have an overpowering desire to bear something green to the nest after the real drudgery of construction is past. The references following the species below, give a more or less detailed account of green leaves in the nest, though seldom in the quantity and certainly not so consistently as in the instance of *Buteo platypterus*.

Ictinia mississippiensis Mississippi Kite, Goss, Bendire's Life Hist. N. A. Bds., 1892, 177; Singley, Davies' Nests, and Eggs, N. A. Bds., 3rd ed., 1889, 166; Short, Oologist, XXI, 1904, 37-39; Peabody, O. and O., XVII, 1892, 170.

Accipiter velox Sharp-shinned Hawk, Fisher, Hawks, and Owls U. S., 1892, 34.

Astus atricapillus Goshawk, Eifrig, Auk, XXIII, 1906, 314; Macoun, Cat. Can. Bds., II, 1903, 229.

Parabuteo unicinctus Harris's Hawk, Goss, Bendire's Life Hist., 235.

Buteo buteo European Buzzard, Seebohm, *British Birds*, p. 205.

Buteo borealis borealis, Red-tailed Hawk, Burtch, *Oologist*, XXI, 1904, pp. 42-43; Sharp, *Ibid.* XXII, 1905, 43-44.

Buteo borealis calurus Western Red-tail, Dunn, *Oologist*, XIII, 1906, 73.

Buteo lineatus lineatus, Red-shouldered Hawk, Burtch, *Oologist*, XXI 1904, 42-43; Wood, *Ibid.* XXIII, 1896, 5; Brooks, *Ibid.* 21-22; Fisher, *Hawks and Owls U. S.* 65.

Buteo lineatus alleni Florida Red-shouldered Hawk, Singley, *Davies' Nests and Eggs*, 1889, 175.

Buteo lineatus elegans Red-bellied Hawk, Bendire, *Life Hist. N.*

A. Bds., 228; Sharp, Oologist, XXII, 1905, 43-44; *Condar*, VIII, 1906, 145.

Buteo abbreviatus Zone-tailed Hawk, Mearns, *Bendire's Life Hist. N. A. Bds.*, 230-31.

Buteo swainsoni Swainson's Hawk, Bendire, *Life Hist.* 239. Fisher, *Hawks and Owls*, 77; Sharp, *Oologist*, XXII, 1905, 43-44; Wheelock, Bds. Cala., 152; Seton, Bds. Manitoba, 234; Macoun, Cat. Can. Bds., 236, quoting Raine.

Buteo brachyurus Short-tailed Hawk, Pennock, Bendire's *Life Hist. N. A. Bds.*, 247.

Asturina plagiata Mexican Goshawk, Bendire, *Life Hist. N. A. Birds*, 252-3; Stephens, Davies' *Nests and Eggs N. A. Birds*, 179-80.

Aquila chrysaetos Golden Eagle, Bendire, *Life Hist.*, 96; Cameron, Auk, 1908, 252..

Measurements cannot be had with any degree of accuracy, especially in diameter, on account of the nests' irregularity; but it varies from 11 to 30 inches in outside diameter, 36 averaging 19 inches. Outside depth 6 to 18 inches, averaging 10 inches. Inside diameter 6 to 9 inches, averaging about 7.50 inches; and inside depth from a fraction to 5 inches, the average 2.50 inches. It is somewhat smaller and lacks the neatness of the Cooper's Hawk nest. The exterior as well as the interior soon becomes flecked with the down feathers of the moulting birds and is a sure indication of its occupancy.

A. C. Bent found a nest at Rehobeth, May 17, '08, containing three eggs 24 feet up in a small white birch which was but 4 inches in diameter immediately beneath a most insignificant nest, flimsily built, about 14x12 inches outside and 6x7 inches inside, lined with a few slabs of outer bark. Wm. B Crispin, Salem, N. J., found a nest on May 27, '00, in a crotch of small pine, 15 feet up. The nest was small and flat, made of a few sticks, and lined with pine needles only. The nest was so small that it would probably have been overlooked but for the sitting bird.

DEPOSITION—At Berwyn, Pa., one day intervenes deposition, ordinarily, i.e. in a set of three eggs, the order is: first, third and fifth day. Sometimes two or more days intervenes. J. H. Flanagan found a nest in Kent Co., R. I., containing one egg, for which a fresh hen's egg was substituted, May 19, '06.

On the 27th the nest contained a second egg which showed no incubation, while the hen's egg upon being broken exhibited incubation of about a week.

DATES FOR COMPLETE SETS—Audubon states that the eggs "are deposited as early as the beginning of March . . . but not until a fortnight later in mountanious parts of the districts in which the birds most frequently breed. Yet the only set of eggs he mentions having seen, was as late as May 30. Some of his immediate successors compromised upon "early April," and a host of later writers, even up to the present time, either boasting of their utter lack of personal experience with the domestic calendar of the species or distrusting their own observations; blindly accept the rather general statement of Audubon or his imitators, causing endless confusion in the ranks of the amateurs. The number of sets of eggs of *Buteo lineatus* and other early breeding *Accipitrines* innocently masquerading under the name of *B. platypterus* is appalling. Any one consulting the Bibliography at the end of this paper will see a number of corrections, preferably by the collector or writer acknowledging erroneous identification; and there can be little doubt that others would be discovered were it possible to have an expert handle the specimens.

The date for fresh eggs in complete sets varies according to locality, of course, but it is coincident with the bursting of the leaf buds on the surrounding deciduous timber, and right here it might be remarked that the immunity from persecution enjoyed by this species during the breeding season is as much due to the thickening screen of leaves nature speedily throws around its habitation as the birds' inoffensive habits. As C. L. Rawson says: "Not one farmer in fifty has ever seen the bird to know it. . . . Even the Lillibridges whose homestead has long been between two of the best breeding stretches of chestnut timber in many a furlong, did not know it, though they had shot, trapped and robbed nests of all the other local birds of prey."

Some latitude is to be expected in my averages through the probable inaccuracies in the reported state of incubation, there-

fore to be regarded as approximate only. 15 sets from the Lower Austral zone average April 28, extremes April 9—May 18. 331 nests from the Upper Austral and Transition zones average May 16, extremes April 24—June 25. 37 sets from the Canadian zone average May 25, extremes May 5—June 22. Western sets appear to average about two days later than corresponding territory in the east, and sets found in evergreen trees appear to average about the same period earlier than those in deciduous trees. The extreme dates are for the most part unimportant, representing as they do single instances of extremely early laying and of final effort after repeated failures. The normal egg producing period in a given locality is confined within about two weeks time, although the females may be about the nest for a month previous to deposition. I have in my possession a female shot from the nest April 17, '95, at Bradford Hills, Chester Co., Pa., in which dissection showed the egg developed to the size of large shot. In respect to the set recorded from Oneida Co., N. Y., on April 24, a very unusual date, Egbert Bagg writes: Langworthy was a good observer and perfectly trustworthy. He is dead many, many years, so I can get no information from him, but I am almost certain that Dr. Ralph authenticated this record before we used it. We were very particular in this respect and 25 years has not disproved a single record on our list. I have looked through my journal and can find only one other record and that was for a full set of four May 14.

Red River of the North, Minn. The time to expect eggs in this region is during the latter half of May (Preston). At Minneapolis, Minn., May 12 to 30. I never look for its eggs any other time, though I have found a set or two both before and after. I always figured upon starting out to collect its eggs on the first date and felt confident of finding complete sets of fresh eggs (Currie ms.). In Ontario it is a late breeder, seldom laying its eggs before the last week in May, though once I found its eggs earlier, May 8, '88 (Macoun quoting Rev. C. J. Young). Lancaster, N. H., May 1, '91, the earliest date; June 3, '04, the latest date; no second sets taken (Spaulding

Broad-winged Hawk (*Buteo platypterus*)

Top and side views of nest and eggs. Berwyn, Pa., May 23, 1909

(Photographs by Alfred C. Redfield)

ms..). Franklin Co., Me., Fresh sets are secured as late as June 2–7 (Carpenter ms.). Bristol Co., Mass., May 14–18 is the local date for fresh eggs in complete sets (Carpenter ms.). Fairfield, Conn. The time of nesting varies but little, the extremes for first sets being May 9 to 19, with one exception, an instance of unusually early nesting that I could never account for, viz: May 17, '94, visited the Strong Hill tract and soon located the nest in a tall chestnut some 50 feet from the ground and a short distance from the old nest of '92. Upon ascending I was surprised to find it contained 3 young about 10 days old, thus showing that the eggs must have been deposited as early as the middle of April. My other birds in their chosen localities nested at usual time (Hamlin ms..). N. W. New York. Average about May 22, with a range of from May 15 to 30 (Short ms.). Renova, Clinton Co., Pa. Earliest, May 5, latest May 12 (Pierce ms.). Chester Co., Pa. Average date for fresh eggs in complete sets is May 15, extremes May 3–19 (Burns ms.). Illinois and Missouri, average May 14, 1891-1905; earliest, May 4, '91; latest, May 19, '00 (Smith ms.). Washington, D. C. Fresh eggs may be looked for from the first week in May until the first week in June (Riley). Leon Co., Fla. The average date for fresh eggs is May 1. I think is would be very difficult matter to find a nest with eggs before the last of April (Williams ms.). In Illinois and Missouri it prefers small woodland areas or groves of some few acres in extent (Smith, Jr. ms.), and in Florida it was found in the middle of a fifty acre woodland (Williams ms.). While collecting in conjunction with Mr. William Palmer in Pinar del Rio Province, Cuba, at San Diego de los Banos, we had some experience with this hawk. While making my way back to a temporary camp on April 7, 1900, I ran across a pair in the edge of open pine woods that bordered a thick tropical growth along the small river that flows by the town, and shot the female which upon skinning, was found to have an egg in the oviduct ready for deposition, but which was unfortunately broken when the hawk was shot or upon handling. Upon visiting the same spot with Palmer on April 11, there was an-

other pair acting as if they had a nest in the vicinity and gave the same note as far as I could tell as the ones found around Washington. Palmer shot the male and it was probably the mate of the one I shot on the 7th, already remated (Riley ms.). *B. p. antillarum* is engaged is incubation as early as March 25, in Grenada, W. I. (Ober).

NUMBER OF EGGS IN SET.—The pioneer writers give the maximum number in a set as 5, and Cory has recently reasserted it. Zadock Thompson gives an instance of a female shot while building her nest in April, 1840, near Burlington, Vt. Within her were found 5 eggs in different stages of enlargement, one appeared fully formed with shell quite hard and in a condition to be deposited in a nest. Bendire gave an apparently authentic instance of a set of 5 eggs collected at Quincy, Ill., and I have made an earnest effort to locate this unique set for the purpose of verification. The collector, T. C. Poling, informs me that he has given no special attention to ornithology for over 15 years; his collection and records were disposed of to Adolph Sutro of San Francisco, Calif., many years ago. J. Eugene Law writes me that Adolph Sutro was one of the city millionaire pioneers and the owner of a fine park in the vicinity of the Cliff House, which was destroyed. Sutro museum stood in the near vicinity. The set is probably now nonexistant, and the few other claims have easily resolved into sets of 5 eggs of *B. lincatus*. J. D. Currie informs me that in Minnesota, out of about 40 sets found, 10 had 2 eggs each, 20 had 3 eggs each, 4 had 4 eggs each, and he considers four eggs in a set extraordinarily rare. Preston found a majority of sets taken in 1896 contained 3 eggs, while those of 1887 had, with few exceptions, but 2 eggs; however, in the total for the seasons, more sets of 3 than 2 eggs were taken.

The 406 sets, of which I have record, are divided as follows:

Canadian Zone.....	1 set	of 1, 26 sets of 2,	23 sets of 3,	9 sets of 4
Transition Zone.....	7 sets	of 1, 65 sets of 2,	98 sets of 3,	4 sets of 4
Upper Austral Zone.....	6 sets	of 1, 80 sets of 2,	66 sets of 3,	5 sets of 4
Lower Austral Zone.....	1 set	of 1, 12 sets of 2,	3 sets of 3,	0 sets of 4
Total	15	183	190	18

It will be seen that we have here another instance of a substantial increase in the number of eggs in a set from the south northward. The number of eggs in a set is therefore 2 or 3, occasionally 1 or 4. When the first complement of eggs has been destroyed, the second clutch usually contain one less egg and the individual egg may suffer only a slight diminuation in size, or diminish in length and increase in short diameter (Richards, Spaulding, Hoag and Currie ms.). A third set seldom consists of more than one egg of inferior dimensions.

Number of Sets in a Season.—This hawk, undisturbed, produces but one set in a season; and when the nest is disturbed, not all have the vitality to attempt a second set in the midst of the moulting period. Riley states that he believes but one brood is reared, unless the first is destroyed, when another set may be laid. Flanagan never found a second set after the first was taken, but on the other hand, Richards gives two instances, one pair producing the third set. Spaulding recalls two second sets of two eggs each which had previously sets of three eggs, laid in the very same nests. Hamlin collected a set of three eggs on May 14, '89, and a few days later on ascending to the nest he found a new lining had been added and three more eggs deposited. These were allowed to hatch but later the young were taken by a friend and reared in captivity. The bird then built in a tall chestnut some 10 rods distant and brought forth their young in safety. Currie writes me that he used to collect a few sets each year and in every case the birds would lay a second clutch of one less egg and always hatch them in peace. Bendire is without question correct in his statement that a single brood is reared in a season.

Measurement of Eggs.—In selecting the eggs figuring in the averages I have used only well authenticated sets carefully measured by competent persons. Eggs abnormal or infertile, and those known to be the second or third laying of the season, have not been used in this connection. The value of any set of eggs would be greatly enchanced, were each egg marked according to the incubation or the succession in which they were deposited. The few sets I have been able to thus sep-

arate, prove in four instances out of five, that the smallest was also the initial. Dr. Coues remarked that he had noticed that the variation, however great, is less in absolute bulk than contour in eggs in general.

Total Eggs	Set	Av.	Max. lgth.	Max. sm. di.	Min.lgth.	Min.sm.di.
9	1	1.89x1.50,	2.00(x1.44),	(1.91x)1.57	1.72(x1.42),	(1.72x)1.43.
182	2	1.91x1.52,	2.12(x1.54),	(2.06x)1.69,	1.74(x1.52),	(1.76x)1.30.
274	3	1.93x1.54,	2.15(x1.51),	(2.02x)1.64,	1.75(x1.53),	(1.92x)1.30.
44	4	1.89x1.52,	2.09(x1.52),	(1.96x)1.58,	1.80(x1.47),	(1.82x)1.40.

509 averaging 1.92x1.53, (49x39 mm.). Sets of 1 average .03x.03, sets of 2, .01x.01, and sets of 4, .03x.01 less, and sets of 3 (which are with sets of 2, the typical number) .01x.01; more than the general average.

There appear no consistent geographical variations in size, whatever advantage is gained by the increase in the size of the set northward, up to the maximum dimensions in sets of three eggs, is lost again in the smaller measurements of sets of four eggs which are the production of northern birds exclusively. Minnesota is apt to produce the slim egg of maximum length and minimum diameter, while Pennsylvania, with New York second and New Hampshire and Vermont third, produces an egg of average length and maximum diameter: in reality the egg of the greatest capacity. Ernest H. Short gives the average size as 1.93 and 1.55, and the largest egg he regards as really authentic 2.06x1.61, taken by L. C. Snyder in Oswego Co., N. Y. Some of my correspondents as well as myself have remarked upon the variation of individual eggs in lesser diameter, often exhibiting from .01 to .03 according to position of calipers. Offering a layman's explanation, this may be due to uneven pressure before deposition, or perhaps the weight of the bird's body after deposition when the shell is more plastic. C. F. Stone has noticed this variation in eggs of the Red-shouldered Hawk he has measured, also. In the oviduct of a breeding Broad-wing shot on April 28, '06, by a friend, were three eggs in formative process: the largest would probably have been dropped in a short time, the shell was of a leathery

texture, pale blue in color and even a few shell marks present; this could be subjected to considerable pressure without breaking, immediately after removal.

Old works on the science almost invariably give the dimensions of the *B. lineatus* for *B. platypterus*, and the archaic methods of measurement were not wholly to blame. Erroneous identification is responsible for a great many specimens of the former labeled as the latter. When Chas. C. Richards measured the Lorenzo Blackstone collection of Broad-winged Hawk eggs in the State Hall, Norwich Free Academy, he also measured the smallest set of Red-shouldered Hawk's eggs in a series of 37 sets. They were 1.96x1.64, 1.97½x1.68, 2.06½x1.86½, and were the smallest he ever saw of the species. His own smallest specimens in a set, of the same bird, are 2.02x1.64, 2.04x1.66, 2.00½x1.65. In the matter of exchange, when a so-called Broad-wing's eggs runs over 1.60 in width, he thinks the collector's reputation should be O. K'd. That the dimensions of the eggs of the two species overlap, there can be no question, and in a region where both species occur, the oologist cannot be too careful in his identifications.

H. W. Beers took a set of eggs in Fairfield Co., Ct., on May 14, '96, which is unique in the wide range in individual shells, 2.08x1.53, 1.92x1.55, 1.57x1.27, the last named being a runt measuring little more in length than the smaller diameter of the first egg. An egg collected by T. and J. Flannagan in Kent Co., R. I., on May 19, '06, in a maple at the edge of a swamp takes the palm for dimensions. It is 1.30x.96 and is well marked with splashes and blotches of rufous brown and lilac. The texture of the shell is coarse and somewhat granulated and a little malformed on one side, and of a dull finish. The nest was found on the 13th with the bird sitting on this runt, which proved infertile. J. H. Flanagan states that he has more than 200 sets of hawk's eggs of the different species of his own take and this is his only runt in hawk eggs. Probably the parent would have proved an aged bird, perhaps unmated.

Verrill gives the measurements of *B. p. rivierei* eggs as 1.80x1.50 to 1.85x1.55.

DESCRIPTION OF EGGS—Someone professes to see only two points of interest in a bird's egg—"One is what the egg is in, the other is what is in the egg." However, there are some very good people interested in the shell. Fragile, exquisitely beautiful specimens, more precious to their possessors than the finest old china, have passed from one generation of oologists to another, gems that love or money could not buy. A series, and sometimes the eggs of a set, show considerable variation in shape, ranging from elliptical ovate to oval; short ovate being the most typical, and ovate-pyriform the rarest. Of the latter type are a set collected at Chippewa, Co., Mich., and described by C. F. Stone; and another taken at Salem, N. J., by W. B. Crispin.

The ground color runs from pure white to grayish, bluish, greenish, and cream-white, grayish-white being the most frequent; the "dirty-white" ground color of most writers being exactly what it seems—dirty, soiled by the bird's feet. The shells exhibit almost maximum range and development of coloration in North American *Raptores*, and a typical set very rarely contains more than two eggs of the same type; not infrequently all are different. In sets of two or three, one egg is almost certain to be of the gray or lavender sub-shell type and the remainder overlaid with pigment. In sets of four, the second egg may be an example of heavier sub-shell markings or lightly overlaid with russet or brown. The eggs of this species also present the odd characteristic of confluent pigmentation at the smaller end or apex as frequent as at the base. Six fairly distinct types are discernable without resort to combinations: (a) Immaculate, or with faint shadow markings. Not so infrequent as generally supposed. (b) Semi-obscured sub-shell markings of impure black or red and violet, producing the different grays, and the lilac-gray, heliotrope and lavender. Present in at least one egg of almost every set. (c) Sub-shell markings and surface stains of ecru-drab, fawn and drab. A rare form of coloration. (d) Surface pigmenta-

tion of yellow-browns, wood-brown, tawny-olive, cinnamon, raw sienna, raw umber, russet, etc. A not uncommon type producing perhaps the least attractive coloration. (e) Red-browns, mars, prouts, burn-umber, walnut, vandyke, chocolate and seal brown. The most common pigmentation, occuring in fully half of the eggs. (f) Subdued reds, rufous, brick, hazel, chestnut, burnt sienna and claret brown. A not infrequent pigmentation and producing very rich combinations; usually when present at all, occurs more or less on all eggs of a set. Appears most frequently on Minnesota specimens.

A white ground shows off the pigments to the best advantage, but the tinted grounds often aid the production of beautiful combinations. The most varied and brilliant series comes from Connecticut, though New Hampshire, Vermont, Massachusetts, Rhode Island, New York, Pennsylvania, Virginia and in the west, Manitoba and Minnesota, produce many beautiful eggs, greatly eclipsing the series from which Major Bendire took his descriptions. Mr. Riley recently informed me that the U. S. National Museum now has a series of 76 eggs and the variations are very great. Most of them have come in since Bendire composed his work, and many of them are much handsomer than any he figured. My own personal experience in southeastern Pennsylvania has been that the eggs taken by myself pale into insignificence in comparison to the brilliant examples taken by H. W. Beers in Connecticut. In descriptions, the blotches represent the larger, the spots the medium and the dot the smallest markings. In nearly all of the pairs visited by Beers, there has been a striking resemblance of eggs for two or often three years, and then perhaps a jump from one extreme to another; from very plain to the most remarkable type or *vice versa*.

Chas. C. Richards describes a set taken at Norwich, Ct., May 15, '08, in which one of the eggs was a solid bluish-white like a Cooper's Hawk, only smaller, the other shell markings of lavender heaviest at the large end, and over this a few light brown spots and blotches. He finds that the texture of the shells of this species is so porous that if the surface be damp-

ened, the markings in the shell will come out quite strong. R. M. Barnes gives at some length the markings upon a set collected June 10, '07, at Hyde Park, Mana., by C. P. Forge. All three show the effects of rotary action in the oviduct before the excessive deposition of pigment had thoroughly set, but curiously spiral or screw-like in formation, as if in progression. H. S. Hathway took two sets at East Greenwich, R. I., in which some of the eggs were strikingly similar to specimens of the Red-shouldered Hawk. Referring to Bendire's plate 7, No. 1 is like his figure 2 of the Red-shoulder, No. 2 like his figure 12 but more evenly speckled, and No. 3 similar but more color on small end, and all in size and shape as his figure 12 of the Broad-wing. No. 1 of his second set is almost identical with figure 13, No. 2 like figure 3 of the Red-shoulder, only more heavily marked, and No. 3 similar to figure 5 of same species, only more evenly marked. A set in the collection of T. H. Jackson, was taken by G. L. Hamlin at Bethel, Ct., and is described as of the size and shape of Swallow-tailed Kite's eggs and almost as handsomely marked. Ground-color, creamy-white, heavily blotched with two shades of brown, heaviest about larger ends. On the surface of one egg in a set of three collected by Albert Lockwood for John Gath, Lorrington, Ct., and described by J. Warren Jacobs, there appear markings in the form of the bust of a man in colonial dress, holding cocked hat in hand near left shoulder. Placed under a glass the blotches lose all resemblance of course. J. H. Flanagan took a set in Kent Co., R. I. on May 19 and 27, '06; the first heavily marked with rufous, the larger end covered as thickly as a Duck Hawk's egg, the remainder more sparingly and evenly marked; the second beautifully marked over the entire surface with large splashes of lilac and a few of rufous. Gerard A. Abbott describes a set in his collection selected from over a hundred eggs, taken at Minneapolis, Minn. Two eggs are almost completely covered over one-third with a peculiar brick-red on the smaller ends; the third is blotched about equally over entire surface and some of the markings are heliotrope. A similar set is described by Richards from the collection of Lorenzo Blackstone, Norwich,

Ct. H. W. Beers took a set at Bridgeport, Ct., in '09 that is described as different from any in his really wonderful series. The markings on both eggs are confined to the small end which is nearly solid bright rose-pinkish tint, and when fresh he thought them more beautiful than anything he had heretofore taken.

Second and third sets of the season are easily recognized. Richards gives the following instances in detail: *First set,* May 12, '08, bluish-white, (1) heavily sub-marked with lavender, under a bright rich hazel in spots and blotches, heaviest at larger end; (2) heavily sub-marked all over in spots and blotches with lavendar, heaviest at ends, two or three brown spots over this, compare to Fig. 10, pl. 7, Bendire's Life Histories. *Second Set,* May 29, '08, (1) similar to first described in previous set, lacking heavy markings at large end; one blotch about an inch square of lavender, center of shell has about two-dozen dark brown spots from the size of a pin to No. 12 shot; (2) dull white, heavily blotched and spotted with chestnut, a few pale lavender spots and small blotches at large end. The *second series-first set,* May 5, '08, bluish-white, spotted and blotched all over with pearl-gray and heliotrope, giving a marked appearance, and a few fine spots of rich hazel-brown on surface, looking like a large whip-poor-will's eggs without gloss: (2) faintly spotted all over with hazel-brown, brick red and small blotches of bright chestnut, with a wash of claret stain nearly all over, have never seen any egg colored like this; (3) greenish-white, shell markings of lavender with a pinkish tint, spotted and blotched all over with light brown. *Second set,* May 20, '08, 200 yards from first nest, (1) almost exactly like first egg of first set, except brighter and shell markings are all heliotrope and has a few blotches and spots of rich hazel-brown; (2) greenish-white, beautifully spotted and blotched all over with rich hazel and chestnut, forming a ring around larger end, one small blotch in the center of the shell has a wash of the peculiar claret on the second egg of the first set. *Third set,* June 8, '08, incubation four or five days, 100 yards from the second and 250 yards from the first nest. The single egg a composite

of the first and second eggs of first set, the color all run together and bleached out as if pigment was about exhausted. Around the smaller end are streaks of lilac and brown that look as if laid on with a brush foul with lint.

Butco platypterus antillarum according to Wells, deposits two eggs, buff color, spotted and blotched with reddish-brown. Clark, however, states that three eggs are usually laid and that he has had the opportunity of examining through the kindness of Dr. Dunbar B. B. Hughes, a number of eggs of this bird, in the collection of the late John Grant Wells, which were obtained in Grenada, W. I. Six sets were represented. The eggs were all bluish-white, unspotted. The natives at St. Vincent also informed him that this bird laid unspotted eggs. *Buteo platypterus rivieri* eggs are described by Verrill as dull white, heavily washed and blotched with rufous, umber and greyish-brown.

DESCRIPTION OF A SERIES OF SETS—From over 100 sets never before described I have selected 15 sets showing, it is believed, every type of coloration known; the whole, added to those already described under previous sub-heads, making a truly magnificent series, which, aside from their value as natural history specimens are a delight to the eye of the lover of the beautiful.

Set I. Easton, Ct., May 30, '03, col. H. W. Beers, chestnut, 35 ft. Ground color white with very slight gloss and just a suggestion of green, 1.98x1.58, quite lightly but regularly spotted and blotched with a stain-like light mars brown, 1.96x1.60, shell markings so far beneath the surface or so light as to suggest a shadow rather than a describable tint. A few faint flecks of mars brown dispersed over surface, comparing with the typical *Accipiter cooperi* egg except in size, shape and texture; slightly granular at large end. 1.97x1.55, practically if not actually unspotted. I could detect a few faint flakes of undeterminable color besides the nest stains. Shell slightly granular at large end. The palest set I ever examined. Ovate. Desc. by F. L. B.

Set II. Chester Co., Pa., May 12, '88, col. by Thomas H. Jackson, chestnut, 48 ft. Dull grayish-white ground. 1.94x1.62, almost plain, sprinkled with dots size of pinhead all over, running into fine lines at greater end similar to markings on an Oriole's egg.

Broad-winged Hawk (*Buteo platypterus*)
A series of eggs in the collection of H. W. Beers, Bridgeport, Conn

1.93x1.61, very similar though much more heavily marked at greater end. 1.95x1.65, quite heavily marked around small end with olive brown blotches and dottings.

Set. III. Easton, Ct., May 18, '08, col. H. W. Beers, chestnut, 30 ft. Almost dead white. 2.04x1.61, smaller end and almost to the middle scratched with countless microscopical hair lines of pale vandyke brown with a few spots and scrawls of a heavier calibre over two-thirds of this area. 1.97x1.57, almost entire surface clouded with longitudinal shell markings of smoke and drab, heaviest in a broad ring about one end, possibly the larger, though the egg appears an almost perfect oval. There are three or four tiny specks of walnut or pale vandyke brown. Oval. Desc. by F. L. B.

Set IV. Trumbull, Ct., May 19, '99, col. H. W. Beers, chestnut, 25 ft. Dead white. 1.90x1.44, palest possible shell markings of drab gray, most numerous about larger end, with scattered stippling of walnut at base, thicker and paler at apex. 1.79x1.39, shell markings of ecru drab and drab, the latter confluent in broad band around smaller end principally, overlaid on surface of minor third and a few scattered to base, with fine spots and blotches of burnt umber. This is a most remarkable looking egg, one which would attract attention in any collection. Ovate. Desc. by F. L. Burns.

Set V. Berwyn, Pa., June 5, '95, col. F. L. Burns, chestnut, 47 ft. White ground. 1.76x1.45, wood brown appearance, heaviest at larger end, stippled or flea-bitten look more often present in the eggs of the Sparrow Hawk. Short ovate. 1.83x1.51, surface stain in large blotches confluent on one-half of the smaller end, extending on this side out to the center, of a very pale mars brown, almost faun. A few shadow-like shell stains of no definite color. Ovate.

Set VI. Calais, Maine, May 17, '94, col. George A. Boardman. Dull white. 1.92x1.52, evenly sprinkled all over with fine dots, small spots and irregular blotches of pale tawny olive and raw sienna. 1.99x1.50, more sparingly splashed with irregular small blotches and scattering dots of wood brown and raw umber. 2.01x 1.51, irregularly splashed with blotches, chiefly about the smaller end, with wood brown and prout's brown. All of these colors have probably faded. Oval to elliptical oval. Desc. by A. C. Bent.

Set VII. Carver, Mass., May 22, '01, col. A. C. Bent, white pine, 40 ft. Dull white. 1.93x1.53, partially clouded with lavender gray, heavily blotched, particularly about the small end, with vinaceous and heliotrope purple, underlaid with irregularly broken blotches or clusters of confluent small dots of cinnamon rufous.

1.89x1.50, heavily clouded with lavender and pale heliotrope purple, particularly about the small end, nearly concealing the ground color, also sparingly washed with vinaceous cinnamon, with one blotch and a few dots of chestnut. Ovate to oval.

Set. VIII. Carver, Mass., May 26, '06, col. A. C. Bent, white pine, 24 ft. Dull white. 1.95x1.52, heavily blotched, principally about the larger end, in an irregular and open pattern, with cinnamon, overlaid with spots of burnt umber and chestnut. 1.93x1.50, nearly covered with small dots, confluent into blotches and concealing the ground color of the larger end, of russet, overlaid with spots of burnt umber and washed at the large end with bright vinaceous-rufous. 1.92x1.50, uniformly spotted with lavender gray, and sparingly with russet and chestnut. Ovate to oval.

Set IX. Berwyn, Pa., May 11, '88, col. F. L. Burns, chestnut, 38 ft. Cited as deposited. White. 1.96x1.54, speckled and spotted over the entire surface, blotched at smaller end, with mummy brown; on the smaller end the blothes are laid on so heavy in places as to appear deep vandyke brown. 1.88x1.63, infinitisimal dots and specks over surface, assuming an almost solid stippled-like appearance on minor third, all of a walnut brown. This flea-bitten semblance gives the ground a creamy-white look whenever visible. 1.83x1.60, under shell markings gathering at the minor end. A few surface markings of mars brown. This egg is of the type illustrated by Bendire in fig. 12.

Set X. Monroe, Ct., May 15, '05, col. H. W. Beers, chestnut, 40 ft. Dead white. 1.90x1.56, spotted and blotched with mars brown, the centers of the largest splotches suggesting burnt umber, confluent in broad band just back of middle and extending almost to base. 1.91x1.51, heavily stained about smaller end with chocolate, overlaid with walnut, scattering irregularly to base in detached spots. A richly marked set of the most frequent type. Ovate Desc. by F. L. B.

Set XI. Monroe, Ct., May 24, '06, col. H. W. Beers, chestnut, 25 ft. Pale greenish-white. 1.92x1.49, a band of vandyke brown confluent blotches centered with the darker seal brown, forming a cap about larger end and has the appearance of having been so thin a stain and the shell so absorbent that it spread and blurred as upon blotting paper, the color regularly punctured with minute bubble-like dots showing the ground color beneath. Two-thirds of the shell unspotted. 1.94x1.53, desultorily smeared in blotches about larger half with clove brown, which appears half obliterated as from a wash before wholly dry. Most of the shell unspotted entirely. A unique set. Ovate. Desc. by F. L. B.

Set XII. Easton, Ct., May 15, '02, col. H. W. Beers, chestnut, 35 ft. White. 2.00x1.50, heavily blotched with burnt umber and walnut, forming a whorl about the base and practically covering the ground. 1.90x1.49, heavily marked with mars brown, ground invisible at base, which has a few scrawls of walnut overlying confluent mars brown. 1.91x1.47, so heavily clouded with shell markings of drab and fawn as to render the ground nowhere plainly visible and about the greater end completely obscured. An almost invisible stippling of pale walnut over entire surface. Quite unique. Ovate to elongate ovate. Desc. by F. L. B.

Set XIII. Trumbull, Ct., May 12, '03, col. H. W. Beers, chestnut, 50 ft. Dead white. 2.02x1.58, very large blotches, some of them .50x.75 in diameter, of a deep rich walnut, almost liver brown, over the larger end and extending in lesser spots on one side only, to near apex. 2.00x1.55, comparatively immense shell markings of drab-gray, one being .50x1.25, chiefly back of greater diameter and spreading in smaller spots toward smaller end, which remains unspotted. These shell markings are partly overlaid with pale vandyke brown, with here and there a spatter of mars brown. A very striking and handsome set. The second not so richly colored as the first, is of the type exemplified in Bendire's fig 11, but much better colored. Ovate. Desc. by F. L. B.

Set. XIV. Carver, Mass., May 25, '07, col. A. C. Bent, white pine, 31 ft. Pale bluish-white. 2.03x1.51, heavily marked with large irregular blotches, spots and dots of cinnamon rufous, brick red and burnt umber, the latter overlying the lighter colors. 1.92x 1.51, heavily marked, principally about the small end with vinaceous rufous and burnt sienna, the latter on top of the lighter spots. 1.89x1.49, more sparingly blotched and spotted, principally in a ring near the large end, with cinnamon rufous and burnt umber. Ovate to oval.

Set XV. Hyde Park, Mana., June 12, '07, col. C. P. Forge, willow bush, 10 ft. Ground color white to soiled white. 1.89x1.49, almost completely obscured by vast numbers of small irregularly shaped bluish-gray markings, darker at smaller end and showing a slight rusty tinge of color. 1.87x1.43, very thickly marked about the smaller end with very light rusty red in small blotches, almost running into each other and scattered over the large end. 1.96x1.55, heavily marked over the larger end with a mass of light rusty, reddish markings, almost obscuring the ground color on that end, and scattered rather thickly over balance of the surface. 1.82x1.40, rather thickly marked with vrey many irregularly shaped blotches of bluish-gray and lavender, a few bordering on a light rusty red in color. Desc. by R. M. Barnes.

Incubation.

This bird is a devoted brooder, both sexes assisting, as testified by Messrs. Banks, Bendire, Knight, and verified by myself An almost invariable sign that incubation is progressing, is the down feathers adhering to the nest. Chas. Richards nicely illustrates the secretiveness and close sitting of the species in his notes of a set taken in an open wood or park, Norwich, Ct., May 20, '08. He says that on the 17th a man and woman were practicing at a mark with a 22 calibre rifle within 100 yards of the nest where the hawk was sitting. On Sunday afternoon 54 people were counted within sight of the nest at one time, and a woman with a couple of children roaminf around was actually sitting on a rock under the nest, all unconscious of its tenant. George L. Hamlin relates an instance where the birds had been sitting about ten days when a neighbor to whom he had revealed the nest, from a mistaken sense of duty, shot the female from the nest. The male completed the incubation, and later, the single young was procured and reared in confinement when nearly fledged. Again, early in May, '93, a nest was found just completed. No eggs were ever deposited and but one bird seen in the vicinity. At every visit he showed as much solicitude as if it was occupied, and several times upon ascending, fresh green poplar leaves had been added to the lining. The nest was not deserted until the latter part of June; the conclusion that it was built by an unmated or bereaved male, seems well founded.

An ancient trick, often very much abused, is to replace an incomplete set with the eggs of the domestic hen, and the Buteo's utter lack of discrimination is evinced by brooding over it for many days. The female not infrequently sits on the nest a short time every day for several days before an egg is laid. J. Claire Wood adds his testimony to mine in this, having witnessed an instance.

John H. Flanagan believes incubation begins with the first egg. In support of this he relates two instances: Nest found in Kent Co., R. I., May 18, '01, contained one egg, and two on the 26th, one well begun in incubation and one fresh. A set

of four taken May 27, '05, incubation varied from fresh to above one week in one egg. Other sets, however, exhibited uniform incubation, which is the rule. Walter A. Angell took an egg and two young just hatched, from a nest on June 19, 1907, and the egg hatched under a hen the next day.

Bendire places the period of incubation at from 21 to 25 days. Near Berwyn, on May 19, '01, at 12 M., I flushed a female from the same nest as that used in '94. Two large eggs lay on a bed of chestnut bark scales, and a single bunch of green chestnut-oak leaves, just garnered. Bird not on at 5:15 P. M. On May 30, I found the lightest marked egg standing on its greater end, punctured by a nest twig. It contained a rather medium-sized embryo. The bird was not seen, though the sound egg was warm. May 31 the male was flushed, no additional lining except a single moulted secondary. June 10, at 7 P. M., female flushed; sides of nest built up neatly, fence-like and about three inches all around with green chestnut-oak leaves and several clusters placed under the egg, the latter slightly cracked at one side. Female protested at the slowness of my decent. June 12, 7 P. M., parent stole off silently and unseen. I heard the faint peeping of the nestling before I was within ten feet of the nest. It had just hatched and not yet entirely free from the large end of the shell, sprawling upon its breast with chin resting on the side of the nest. The female uttered a protest from a nearby tree, and I hurried down, being just seven minutes from time of strapping on climbers until on my road home. I would place the period of incubation of this egg at fully 24 days, as to the best of my knowledge the egg was perfectly fresh on the 19th of May. I regret to say that all other of the several tests made by me, were less perfect through my inability to ascertain the exact dates of commencement, though I have been fortunate enough to be present within an hour of the hatching on more than one occasion. Fred H. Carpenter offers two instances for calculation, both from Bristol Co., Mass.; May 17, '03, two eggs; June 4, no change; June 12, one young at least two days old, and one addled egg. May 17, '03, three eggs, one taken proved fresh;

June 4, no change; June 12, one young and one pipped egg. Apparently a period of 23 to 25 days.

Young.

CARE OF THE NESTLING.—I have studied the nestlings of five different nests. So silent and secretive are the devoted parents that only one nest was discovered after the brood had appeared. I had passed and repassed almost daily the white oak which stood at the juncture of two woodland paths, without discovering the hidden nest, and it was not until I had finally tarried awhile at the nest of an Oven-bird close by, that I noticed the ground within a radius of perhaps twenty feet plentifully besprinkled with the excrement of the three young larger than squabs, that the female at last betrayed, June 19, '00. Contrary to the general belief, the forcible ejection of excrement is not peculiar to the young alone as any one having an adult captive may discover. In another instance the single nestling hatched on June 12, and left the nest July 23, '01, a period of 41 days. In another instance two out of three eggs hatched on June 3, '06, and the infertile egg disposed of soon after. Later one of the young died and was probably carried away. The remaining nestling was taken by me on July 1, after it had prematurely flushed from the nest on my unexpected appearance; the period was 29 days. Abundance of food is provided and the nest supplied daily with green leaf sprays, by the parents The tender young are protected from the hot summer sun, inclement weather and cool nights. I have found the male covering 5 days old hawklets. Even when they have become fairly well fledged, one or the other of the birds seem always in attendance in a nearby tree top. The whistled protest of the parents as they shadow one through the woods, is all the hint one often has of their presence and unceasing vigilence. How long they are guarded after leaving the nest, I am unable to say, but for a week or two after the nest is vacated, a protesting whistle from a hidden form in the neighboring foliage informs one of the jealous care of the juveniles doubtless also hidden nearby. The immatures

Broad-winged Hawk (*Buteo platypterus*)
Nestlings about two weeks old
(Photographed by Thomas H. Jackson)

are unmercifully driven out of the adults territory the following spring, should they attempt to invade it. Parental care does not survive the winter's frost.

DISPOSITION OF THE NESTLING—The spirit of adventure and acquisition which leads men to oological fields, fails to attract many to the equally important study of the young; therefore I am compelled to rely almost wholly upon my own data in this respect. I appreciate the fact that in viewing the beautifully painted shell ruined by the struggling chick, the feelings of the oologist are akin to those of the orderly collector of skins observing the plucking of the feathers of a rare bird; or the photographer, seeing the bird he is about to picture, fall before the gun of a sportsman.

The chick utters a peeping cry as soon as out of the shell and appears hungry as soon as its down has dried. I have seen it turn its head and bite at my thumb, when less than a day old. For some days the adults dismember the food and the young soon learn to snatch it piecemeal from their beaks. When from five to eight days old it sits erect and its mouth flies open at every sound; it is able to disgorge a pellet the size of a hazelnut, scratch itself and behave as well to its mates as the best tempered of birds.

DEVELOPMENT OF JUVENILE PLUMAGE—The young upon hatching June 3, '06, was well covered with white down, eyes and bill blue-black, cere very pale yellow, feet, tarsi and edge of mouth flesh color; and eight days later the feet and tarsi were the palest possible flesh tint with incipient yellow cast, and the talons blue-black. Another about 10 days old June 20, '07, was entirely covered with down except the abdomen, which was bare; the skin around the eyes greenish-yellow; midway between tip and beginning of the curve of the beak was a whitish protubrance; in all other respects as described in last year's nestling.

For my own convenience my subjects have all been taken from the nest at some period and reared in captivity. I endeavored to supply them with their natural and as varied food as they would have received in their nests; therefore the growth

of the feather tracts was perhaps altogether normal. Chester Co., Pa., June 12, '10, one young about 10 days old, weight 4 ounces, still in its nestling down, pupil appears blue and iris deep brown. June 17, about 15 days old, primaries and secondaries developing in quill; June 18th, greater coverts appearing in quill; 19th, alula, scapulars, inter-scapulars in quill; 21st, coverts coming out quite regularly, also nape and rectrices; 22nd, 20 days old, primaries, secondaries and tertials bursting sheath, nape down to middle of back, upper tail coverts; 23rd, sides of breast, irides wood brown; 24th, interscapulars show through white down quite prominently, rump pin feathers (compared with young bird in nest July 4, '00, known to be 22 days old; down covered head, neck and thighs, primaries and secondaries broken sheath and partly developed, breast feathers dashed with tawny but not to middle, irides hair brown); 25th, colors distinguishable; 26th, pin feathers down back to rump, under tail coverts; 27th, pin feathers spreading on abdomen and breast. July 1st I was compelled to kill this bird. On the 27th I was away all day and left word that it should be fed often, but my niece neglected it, and the poor little creature, frantic with hunger, tumbled out of its box in its efforts to meet me as I entered in the evening, breaking its right leg above the heel and since almost refused to eat. Description: feet and tarsi straw yellow, cere citron yellow, edge of mouth, skin of lores and lower eyelids, pale greenish-blue; irides mouse gray, weight 9 oz., about 29 days old.

Two captives taken on July 2, '07, 22 days old, were "Tuck" the larger, older and male bird; and "Nip" the female; natal down, except as herein noted, humeral tract or scapulars evidently first showing two or three days back; alar tract, secondaries, terials, greater upper wing coverts, followed by the primaries, primary coverts and alula, rectices less than one-half inch in sheath; ventral tract, patch appearing on side of breast but not below; spinal tract, first traces between shoulders; femoral tract, first traces; irides slightly lighter. July 3rd, spinal tract, first traces appearing prominent; humeral, spreading, showing a V-shaped tract when wings are closed; altar-primar-

ies evidently later than secondaries, middle wing coverts as well as lesser coverts not yet in evidence except a few scattered feathers, primaries 3.40 on Tuck, 1.70 on Nip; caudal, rectices 1.87 Tuck, 1.40 Nip, upper tail coverts just appearing; femoral, first appearance beyond down; ventral, slightly extending; capital, dark feathers appearing on crown on Tuck, July 4, humeral tract spreading out over shoulders; ventral spreading a little on breast and extending slightly towards abdomen, crural—scattering, femoral extending downward. 5th, 25 days old, spinal tract spreading out over shoulders, ventral spreading a little on the breast and toward the abdomen, crural, scattered feathers appearing on the legs and flank extending downward to legs. 6th, spinal tract extending toward neck, a thin line from back of shoulders to almost small of back and appearing again at rump; humeral well grown, femoral extending rapidly to tibæ; capital extending on hind head of Tuck, malar in dusky dots, dark feathers just appearing under down of crown in Nip; alar filling out rapidly, lining of wings developing, ventral filling out and extending; caudal, greater upper tail coverts well along and lesser spreading, under tail coverts growing rapidly. 7th, spinal tract broadening between shoulders and at rump and scattered almost to hind neck, erectile upon excitement, rump almost complete on Tuck, scattered and less complete on Nip; alar, upper wing coverts almost all showing, only considerable gaps about median, under wing coverts starting, lining well along, feathers of thumb one inch out of sheath, as they have been for some time; capital feathers extending downward to and on hind head under down, crown feathers appearing above down on Tuck; lores appearing in dark dots, ventral feathers practically complete below breast, first band of tail of Nip and second of Tuck. Head, neck, middle of breast, edge of wing, median wing covert region, back of shoulder to rump and under wings, downy. July 8, Tuck has the richer underparts and more rusty edging of upper plumage so far, and a scattering of dark feathers all over center of crown and hind head, lores extending to eyes and malar to ear coverts; Nip's rump not at all complete, con-

sisting of a scattering of feathers, median coverts with frequent bare spaces, first evidence of dark feathers above down on crown, ear patch and lores broadening, second tail band clear of sheath, primaries and secondaries not wholly clear but the dark bands have become prominent; cast sheaths plentiful. July 10, 30 days old. Tuck has an increase in feather tract of crown, hind head, and almost complete from forehead to shoulders, lores connected with cheek by broken line over eye, chin feathers appearing on either side, forehead only immaculate down; lining of wings almost complete, downy tract at base of quill feathers; spinal tract complete from shoulder to rump, thighs and spots on the middle of breast downy, irides plumbeous-gray. Nip, spinal tract almost to rump and creeping up back of neck, ventral shows a downy line down the center of breast, breast feathers extending toward throat; middle of crown and hind head exhibiting a sprinkling of dark feathers, wing lining not yet complete, eyes darker than Tuck's. July 11, Tuck almost completed juvenile plumage with the exception of inner thighs, anal region, area under wings between rump and femoral tract; down also remains on the middle of throat, sides and back of neck, forehead and supra-orbital region, though the darker feathers have developed under all except the middle of the throat, third band appeared on tail, a sub-malar streak and under primary coverts have appeared. Nip is not so well along, though the spinal tract is complete; the head almost as far along except forehead, chin and throat; wing lining shows a downy line at roots of quill feathers, scattered feathers creeping up on throat; 12th, Tuck still has some down areas on a line over eye, middle of forehead, eyelids, posterior half of orbital ring, just back of ears, and middle of chin. Nip has a greater extent on the same places; 13th, little change, less down; 14th, Tuck, under wing coverts; 15th, third dark band on tail. Tuck's eyes almost pear gray, down almost absent except on middle of chin. Nip, down above eye and to a small extent back of it, a little on forehead and more on middle of throat and chin; July 17th, fourth dark tail band on Tuck; 19th, fourth dark tail

BROAD-WINGED HAWK, 23 days old. "Nip and Tuck."
Photo by Lucy Sampson

band on Nip; 20th, fifth dark tail band appearing; 23rd, Tuck has lost all traces of down; 28th, Nip has six bars on tail, same as Tuck, and has no longer traces of down under chin or about eyes. August 3rd, seven bars on tail; 9th, both hawks' eyes at last a clear pearl gray without the brownish, cloudy effect.

A female designated "Buteo" was taken from the nest July 1, '06, when 29 days old, when the juvenile plumage was developing under nestling down, the tips of nearly all the feathers bearing tufts of down, the occupit, lores, middle of breast, etc., only in the natal stage, irides pearl gray. July 4, wing 15:50, tail 3.50; 6th, second bar appearing on lengthened tail, barring appearing on primaries and secondaries; 7th, down off of back and wings, confined to ends of rectrices, wing coverts and head; 9th, tail shows five narrow dark bars, down almost absent from head and chin, whole upper plumage exhibits silky sheen; 10th, down yet present on wing coverts, strip over eye, middle of forehead, middle of chin, scattered on malar; 15th, down disappearing from all but middle of chin and throat; 22nd, chin down absent; 23rd, seven dark bars on tail, irides darker; August 5, rufous edging of upper plumage worn away; Sept. 17, irides a light burnt umber.

It will be noted that the irides became pearl gray in 29–34 days. Juvenile plumage shows first signs of development when the bird is 15 days old and is completed by the 45th–51st day, a period of about one month to five weeks. Jefferies notes eleven primaries, ten coverts, and a terminal claw, in the young examined.

DEVELOPMENT OF INSTINCTIVE HABITS—A nestling at 10 to 12 days of age snatched bits of meat from my fingers, rejecting a bit with a piece of bone in it, throwing the morsel some distance; and peeped lustily for more. It could turn about the box very quickly, prance on one foot at the time and go through the motions of preening its own feathers, and slept with the crown of its head on the bottom of its nest with its beak between its thighs. First attempt to pick up food was when it had attained the age of 17 days, unsuccessfully attempted to

hold the meat in its claws by one foot then the other forward. Fed to the limit of the capacity of its crop, it would flatten out on its breast with extended wings and head for a sun bath, and learned to pull food from my hand with the twisting motion of the adult.

As my head came to the level of the nest of a pair of nestlings 22 days old, they arose upright with wide open mouths and while they almost fell over backwards with surprise, they seemed as yet devoid of fear. The female, for so it proved, showed the most spirit and enterprise though a day behind the male in growth. At 23 days of age they stood upright in homemade nest, dressed their plumage, whistled in a chucking voice, picked the dismembered bits of 4 English sparrows from my fingers, gathered them up from the nest and snatched them from one another. When 24 days old the wing and leg exercises began They danced with raised wings, heads bent toward lifted toes and wings almost touching above. During the day they occasionally lay on their sides with extended legs and slept at night squatting on their keels with heads partly under left wings. The next day they fought one another over the food, plucking at one another's heads and necks, the male, which is the largest, on the defensive. Both whistle, grasp and tear food with talons and beaks. On the 26th day the male grew timid, dined with its back toward me, blanketed its food with its wings; the female on the contrary fearlessly faced me, continued its whistled "chucks," and then turned upon its nest mate and whipped him thoroughly. 27th day both could be easily handled. When full to bursting, they moved their heads and necks backward, forward and sideways. Female fought for and obtained from the larger male, two live English sparrow nestlings which she killed. I reduced their meals to four a day. On the 28th day, male showed fear plainly, no longer accepted food from my hands, the next day absolutely refused to eat while I was looking, and the day following flew about to avoid me, while the female continued gentle and fearless. On the 31st day the female ate 12 good-sized crayfish, seemed to relish tearing them apart and devouring the pieces, though

when one big fellow caught her by the leg, she backed away, and did not appear anxious to risk another nip. The male would not come down to feed. The next day the female refused for the first time to take food from my hands, and the following day began to fly about. When 37 days old, just before a thunder storm, both retired to the shelter of a box and huddled together in a crouching position, timidly peeped their fears; but two days later during a very heavy shower I observed both now, nearly of a size, exposed to the full force of the storm. They drooped their spread wings forward slightly above the level of their backs at times, seeming to enjoy the bath. When 40 days old both were very wild and made constant attempts to escape thrugh the wire enclosure. This is the age of departure from the home nest. The next two days both birds clawed me fiercely, whistling excitedly, and would not touch food until I departed. When 46 days old the female which has at last outgrown the male, swooped down, snatched a piece of meat and carried it to a favorite perch ;and by another week or two, learned to whistle insistantly when hungry, until fed; a long drawn harsh shrilling *che-e-e-e-e-the-e*. My first and in some respects most interesting captive was taken when at the age of 29 days. It flew from the nest when I ascended but unable to sustain flight, came down on the banks of a creek below and was captured after it had turned upon its back and fought savagely, uttering a repeated *Chic-chic-chic*. It proved to be a female. It refused to eat at first. I had to force food down its throat, but it rapidly responded to kind treatment and by the next day perched upon my hand. It made several attempts to swallow a mouse whole when 35 days old, then turned its back to me, blanketed its prey with spread wings and tail, for the first time used its beak in conjunction with talons to tear and feed; and in consequence grew fierce and wild over night since it could help itself, and pounced upon a dead mouse and various sparrows with great gusto. When 39 days old it eyed live and fully fledged English sparrows before striking with right foot, and listened momentarily to their cries. This was its first kill and attempt to pluck feathers

before eating. On the 40th day it learned to spring from my hand to sieze its prey in its beak before placing it under its talons. Could fly well and began to long for liberty. One week later it beat against the window. It learned to eye its feeding board whenever I appeared, and a stranger so fiercely as to have the appearance of about to attack him; and for the first time used its left foot in striking its victims. It was not until it was 89 days old that it uttered its first "rusty hinge" whistle, the adult and harsher cry than the juvenile.

Moult and Renewal.

Much to my surprise I could discover absolutely no literature on the subject except the following eight words from Maynard: "Like most hawks, these birds moult in August." Of the closely related Swainson's Hawk, Dr. Coues writes: "A moult occurs in August and September; it is protracted, the feathers being very gradually renewed, almost one by one; the fresh heavily colored feathers contrasting strongly with the ragged and faded ones worn during the summer. The young have no moult at this season. I have no observations upon a spring moult, which probably occurs in both old and young." Newton intimates that Diurnal Birds-of-Prey generally moult in mid-winter or even later. Under the title of "Observations on the Color Changes in the Genus Buteo, Apparently Due to Aptosochromatism" (*cf. Bul. Hadley Climatological Laboratory University, New Mexico*, III, 7, July, 1903, 1-14) the late Frances J. Birtwell gave the results of the examination of an adult and juvenile *Buteo swainsoni* on Dec. 7 and May 6, and an adult *Buteo borealis calurus* on Dec. 7, and April 1, confined in a basement during the winter, to prove color change without moult. Unfortunately May 30 witnessed the only collection of moulted feathers and the search for new growth on the birds at the time of skinning.

Plucked of feathers the adult is found completely covered with a heavy coat of down, even to the tips of the wing bones and heel joints; white, except a dusky streak along the wing bones at the insertion of the greater coverts.

Broad-winged Hawk, 29 days old. "Nip and Tuck."
Photo by Lucy Sampson.

Oologists, with their intimate knowledge of the breeding habits of the bird, frequently note traces of moulting about the nest. Fred E. Newberry writes of a bird sailing over the tree tops dropping a large quill feather at his feet, and of occupied nests profusely feathered; Chas. C. Richards of three tail and numerous body feathers under a nest in June, from which the young had fled; and J. Claire Wood observed traces of the adult plumage in the lingering migrant immatures in June, suggesting a transformation into adult plumage during the summer of the second year. I have frequently gathered moulted feathers in the woods and under the nests, recently dropped, during the nesting period. A skin in the collection of the Phi. Acad. Nat. Sci., taken at Hudson, N. Y., as late as May 25, shows no evidence of moulting, however. Trowbridge states that he has found several of the adult specimens shot in Sept. 24, '87 ,at New Haven, Ct., moulting about the head. He fails to inform us, however, that otherwise these were in fully renewed plumage.

My captives passed through the annual moult I believe in no wise different from the average bird of the same species in a state of nature. They received sufficient natural and varied food, were kept in the open and altogether in a healthy condition. I gathered the moulted feathers once or twice each day and placed them in dated envelopes, and the birds were examined as frequently and as critically as it was possible to do where the subject was a biting, clawing and struggling savage. The feathers on one specimen dying in February were actually counted, numbering 2842; the smaller feathers of the head, chin, throat, lesser wing coverts and under wing lining, about totaling 1805 feathers, were largely lost in the open cage, but most of the balance and more important plumage, saved as above related. My notes follow:

First Moult, Post Juvenile—The spring moult began with the female "Nip" on the morning of April 19, when the 10th and 9th pairs of primaries and first scapulars dropped; by the 24th the 8th primary and first scapulars were cast, followed by the 7th the next day when the 10th, 9th and 8th primaries

and coverts broke sheath ,marking the commencement of the renewal. May 5th the right 6th primary fell and the first alula followed on the 6th. On the 8th, the right 5th primary, several great and middle wing and under tail coverts fell. 9th the 6th left primary, first indication of interscapular and side of breast moult; renewal of last three primaries and coverts about completed, and the 7th a little nearing bursting quill. 10th, first scapular moult of moment. 11th, middle rectrices, middle tail coverts, smaller alula, increase in scapular and wing covert moult. 14th, beginning of wing lining moult, 7th primary more than half complete, 6th bursting sheath, one tertial cast. 17th, right primaries several days ahead of left, 4th right primary cast, middle tail coverts breaking sheath ahead of rectrices. 18th, increase of under tail covert moult and first flank feather cast. 19th lesser coverts at bend of wing lost. 22d, 4th primary on right nearly three-quarters grown, 6th and 5th not more than one-half, 4th primary on left, 3rd on right and 2nd left secondaries cast. 24th, outer pair of rectrices, increase in median coverts and first cervix feathers fell. 25th, middle rectrices and coverts one-third grown, last four primaries full, 6th two-thirds, and 5th and 4th bursting quill. 26th, first abdomen, increase in breast, side, flank and scapular moult. 29th, jugulum moult, rectrices 3rd from center, 3rd primary dropped. June 2, 3rd primary almost complete on right, in quill on left, middle rectrices show the second dark bar, 3rd from center appearing out of quill. 8th, alula moult complete, secondaries one pair about 2nd half completed, another about 6th one-third grown, corresponding coverts bursting quills, interscapulars in two lines up the back, half size and conspicuously dark, hind head renewing and two scattered lines on either side of the breast half size; long flank, side and abdominal feathers loosering up. 9th, left 3rd and right 2d primaries, many breast feathers, throat, first rump, tibæ, several tail and wing coverts cast. 10th , middle and lesser coverts with but a scattered renewal, bend of wing and lining practically renewed, middle rectrices almost complete, outer pair one-half and but two old pairs remaining, upper and under tail coverts but little ad-

vanced in pin feather stage, a row of barred feathers appear on either side of the breast and a solid row of interscapulars on back. 14th, primaries—1st old only remaining, 3rd and 4th not quite full length on right side; on the left 2nd and 1st old remaining; secondaries, right, about 3rd and 6th almost three-quarters length, left, 2nd, 5th and 6th same length, middle coverts everywhere in pin feather stage, 2nd greater secondary covert almost complete. 18th, no marked moult for three or four days, middle rectrices complete, 2nd primary on right and 3rd on left appearing, greater coverts keeping pace with secondaries, middle coverts breaking sheath, and scattering of lesser coverts in quill, scattered row of pin feathers running up to crown of head from back, also renewing on forehead, two rows breaking sheath on either side of abdomen and one more on breast, chin naked except from under coat of down. 22nd right 1st primary dropped. 23rd, under tail coverts equally along with corresponding rectrice. 27th, left 2nd primary one-half grown, 1st not yet cast, scattering of new feathers on crown, new growth extending out moderately on breast and back. July 5th, 4th from central rectrice appearing, breast and abdomen well covered through new feathers constantly appearing, interscapulars spread over the middle of the back, outside row practically completed, new pin feathers on neck and crown. 8th, extremely heavy moult including last remaining left 1st primary. 12th, renewal of primaries complete except left first, which is one-half. 19th much down pulling out on perch and twigs, secondaries apparently 7th to 10th just out of sheath, 1st and 4th not yet cast; last two pairs of rectrices, next to outer one-half, next to middle just breaking sheath; breast, abdomen, back of neck and head still with many pin feathers; inside of tibæ almost featherless. 26th, inside of tibæ and under wings next to body almost bare, some incoming pin feathers; still renewing on breast, and heavily on back and head; long axillars dropping rapidly, tail almost complete. 28th much down from under wings and flanks being moulted. August 2, primaries complete except left 1st which is three-quarters; secondaries and tertials scattering, five pairs com-

plete and four pairs two-thirds grown; two under primary coverts two-thirds only, all the rest complete; under wing coverts mostly complete toward tip, yet contains some pin feathers well forward, and gaps near body; lining of wings almost complete, greater wing coverts and scapulars apparently complete, middle and lesser coverts less forward; tail, except renewal of a broken middle rectrix, complete; all body feathers including inside of tibæ, complete. 28th, full feathered some days past, including completed length of second new middle rectrix. A little richer buff and not so heavily marked on breast as the male. Eye growing lighter, ashy-brown.

Moulting commenced with the male "Tuck," on May 8th when the 10th primaries and coverts, also alula, were cast in pairs, and completed September 5th with the renewal of the secondaries.

Recapitulation—Female, primary moult began April 19 with the 10th, continuing in regular order in increasing intervals until 1st quill on left side was dropped July 9. The new quills generally breaking sheath in from 5 to 10 days after moult, 10th and 9th breaking forth April 25th, complete by May 9; after which there was a gradual slowing up the first requiring 24 days to perfect itself. Primary coverts moult and renew simultaneously with primaries.

Secondary moult May 8-July 20; renewal complete about August 28; occurs in rather irregular order, apparently in groups of 2nd and 3rd, 6th and 7th, then a break about 9th, several falling together, 4th and 1st completed last. Secondary coverts a little later than corresponding secondaries. Rectrices May 11-July 5, new breaking sheath May 17-July 19, complete June 18-August 2. Sequence—Central, outer, 3rd, 2nd from central, next to outer, next to central, 4 and 3, 5 and 2 coming in almost together.

Male—Primary moult began May 11, completed with 1st, Aug. 1; renewal, 10th on June 10, 1st on Aug. 28, complete. Rectrices, moulted May 28 July 25, sheath breaking June 2-Aug. 2, complete June 23-Aug. 16. Sequence—Middle, outer, 3rd, 2nd from central, next to central, next to outer. Feath-

ers nearly always moult and renew in pair on opposite sides of wings, tail or body, sometimes one feather will fall a few days ahead of its counterpart, and it has usually been on the right side.

SECOND POST NUPTIAL—In 1909 the female began moulting on April 11 and completed by August 31, the periods of heaviest moulting of the body feathers occurred June 21–22, July 10–12, 24, 30–31. The renewal was visible about May 4, and the new plumage entirely completed on Sept. 6. The sequence of the primaries was the same as the first moult except that the 10th did not fall until after the 2nd and previous to the 1st. I was unable to solve the sequence of the secondaries, the moult and renewal taking place almost simultaneously about 1–3, 7–9, and 4–6. Sequence of rectrices—central, outer, 3rd, 2nd from central, next to central, next to outer; the central and outer, 3rd and 2nd from central, next to central and next to outer moulting and renewing almost together. Alula—3rd, 2nd, 1st and 4th, May 28–Aug. 22. The medium scapulars are the first to moult.

THIRD POST NUPTIAL—The full, rich plumage of last fall bleached out wonderfully during the winter, and the perfect adult plumage was attained under the same conditions and in the same order as last year's, except as follows:

PRIMARY MOULT.				SECONDARY MOULT, 1910			
May 15,	left 9th;	May 21,	right 9th.	June 8,	left 5th;	May 31,	right 5th.
May	" 8th;	May	" 8th.	June 20,	" 2nd;	June 18,	" 1st.
May 22,	" 7th;	May 22,	" 7th.	July 5	" 6th;	July 1,	" 3rd.
June 1.	" 6th;	May 24,	" 6th.	July 7,	" 3rd;	July 16,	" 6th.
June	" 5th;	May 31,	" 5th.	July 17,	" 4th;	July 18,	" 4th.
June 5,	" 4th;	June 8,	" 4th.	July 25.	" 1st;	July 24,	" 2nd.
June	" 3rd;	June 13.	" 3rd.				
June 22,	" 10th;	June 22,	" 10th.				
		June 26,	" 2nd.				
July 22,	" 1st;	July 14,	" 1st.				

The moult began about May 15, and was completed by Aug. 13; the renewal was complete by September 1. The upper and lower tail coverts agreeing in time of renewal with corresponding rectrix. The under primary coverts began with the shortest, about the time the 3rd primary is dropped, and the longest

axillers were dropped on June 18, followed irregularly by the smaller feathers. Up to July 24 the new underparts appeared devoid of yellow, but by the last of the month commenced to take on the rich tint. Freshly cast primaries, secondaries and scapulars, gathered about the nests of breeding birds, seem to indicate that my captive began and continued moulting several days in advance of the wild birds of this locality.

If this species has a regular winter moult in its southern home, I can find no evidence of it. All spring migrants I have seen with the exception of one Cuban specimen taken Feb. 2, 1906, which shows little wear, have the bleached out, well worn plumage similar to my captives of the same period. To me the dark phase is synonymous to the new, and the gray phase to the old, well worn plumage of the spring and early summer months.

The specimens J. H. Fleming has examined from his own and the Dwight collection, contain some very interesting South and Central American skins. An adult female, Palcaju, Peru, Nov. '02, has fresh primaries and secondaries, the latter probably the newest; all wing coverts are worn, there is a good deal of chestnut on scapulars and interscapulars. An adult male, Merida, Venezuela, Dec. 20, '03, is almost fully adult; first primary is nearly full grown, but still in quill at base of both wings, the second primary is new as are all the others except the third on the right which is slightly worn; the secondaries are slightly worn, the secondary coverts more so, a good deal of chestnut shows on the scapulars and back of the neck; the tail feathers are nearly fresh. Adult female, Merida, Venezuela, Mar. 24, '03, the secondaries and tail feathers are worn and some chestnut on interscapular region. Adult female, Carrilla, Costa Rica, April 5, '95, the feathers of wings and tail very little worn, the bird practically in full plumage. Adult female, Boqueti Chiriqui, Panama, April 25, '03, two of the secondaries very much worn, the rest and the primaries are fresh; the chestnut on interscapular region almost worn off.

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